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VOL LVI 8 MARCH 1947 No 1443

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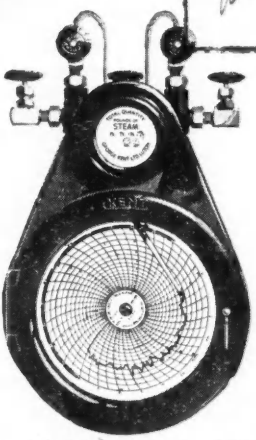

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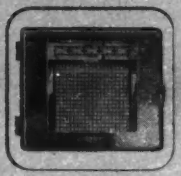

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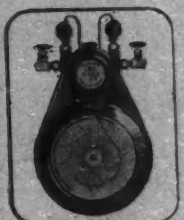

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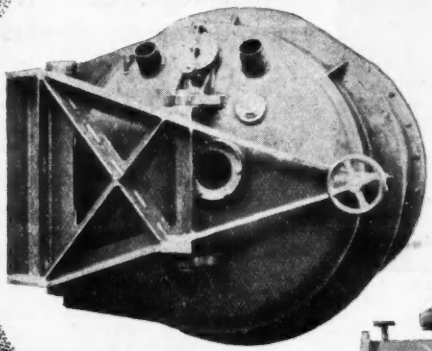

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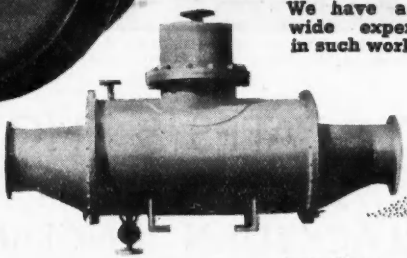

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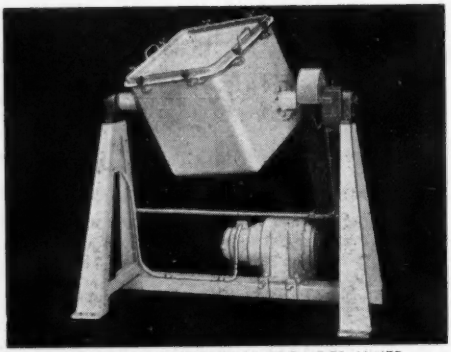

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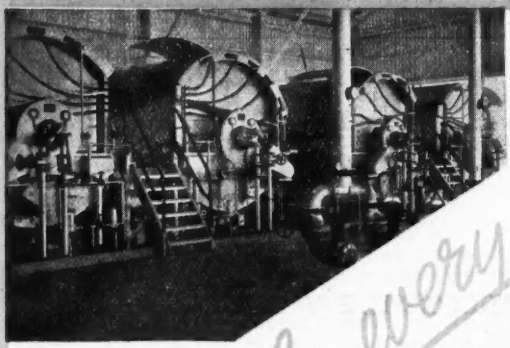

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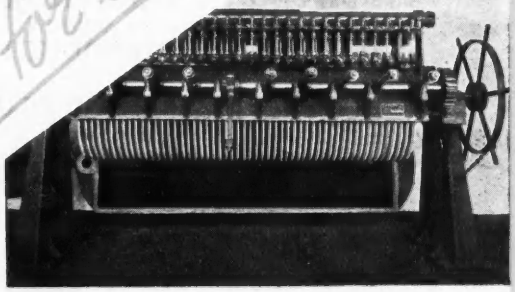

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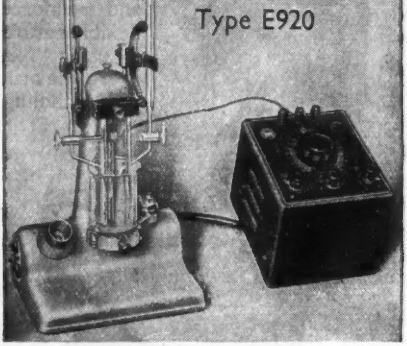

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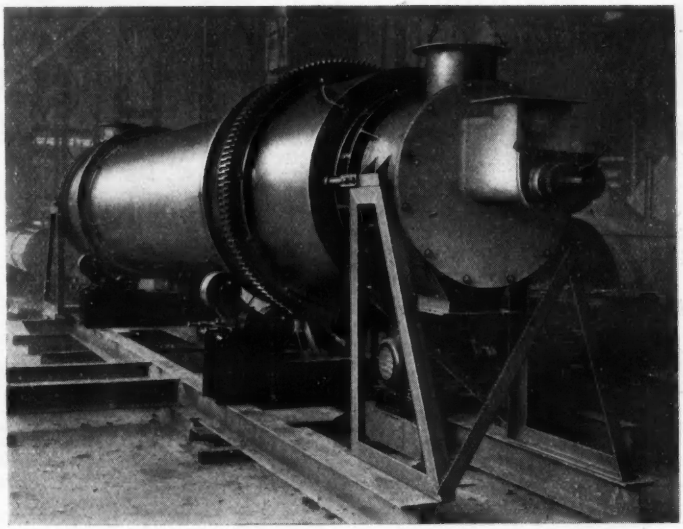

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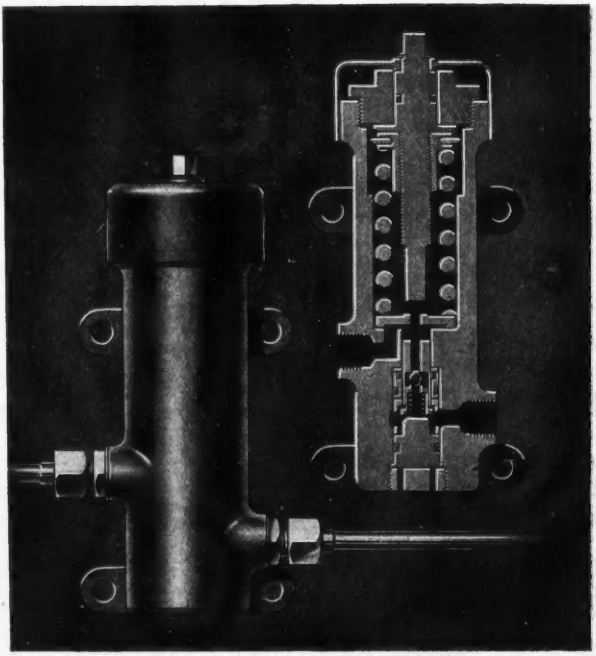

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TOP RIGHT. Jacketed Paddle Mixer

CENTRE. Retorts in Heat-Resisting Cast Iron.

LOWER LEFT. Sulphur Burner.

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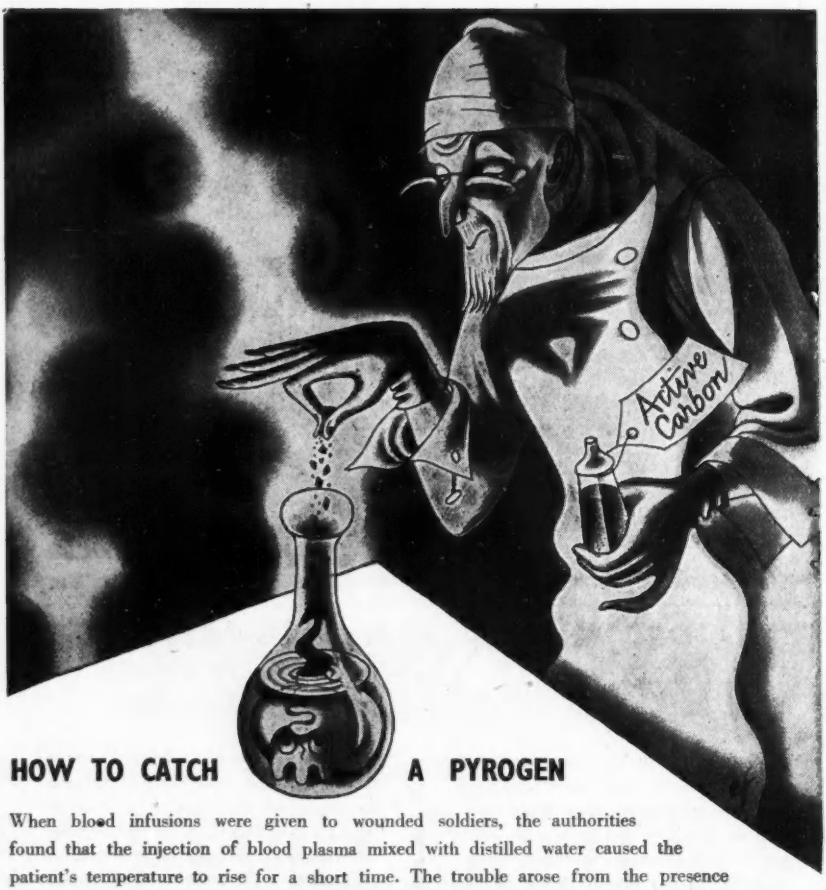

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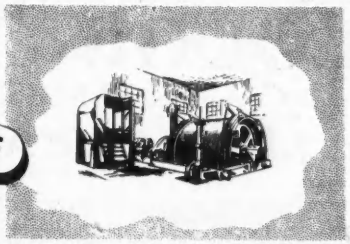

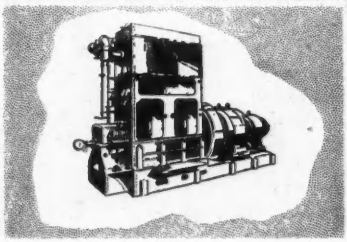

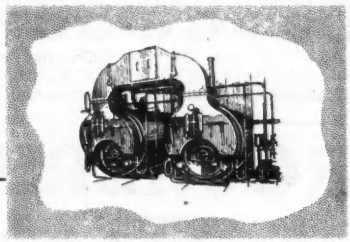

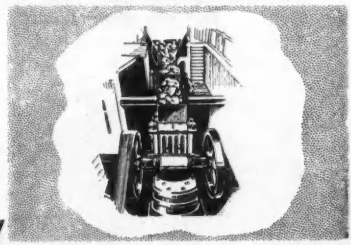

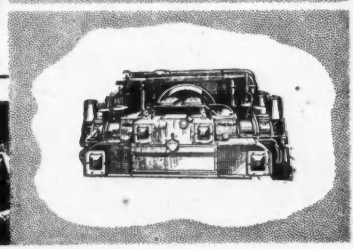

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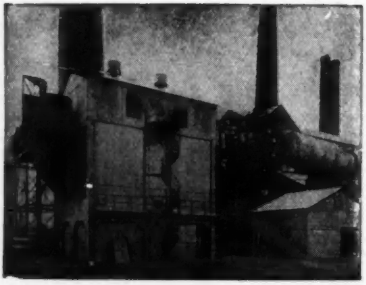

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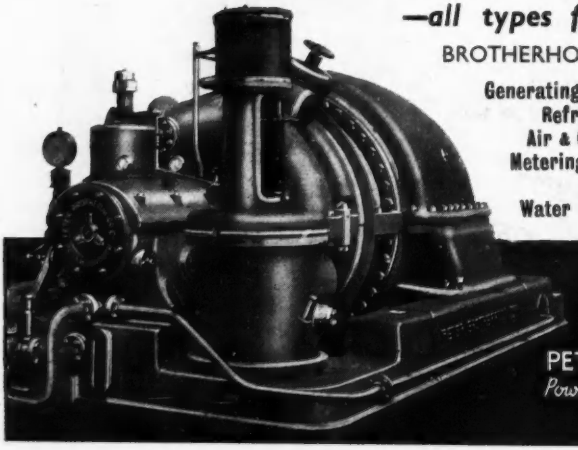

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Elementary Economics

THE Government White Paper "Economic Survey for 1947" is an important document which derives its value from being a public statement of facts that have long been known to everyone who has studied the economics of our financial position. The value of the survey is enhanced by linkage with official figures which lend point to the general principles. Its effect will depend upon how far the lessons it teaches reach their target and sink into the consciousness of every individual in this country. We might single out the Trade Unions as especially in need of learning this lesson; a Continental friend has lately expressed the opinion to us that British trade unions are in their ideas and policies 20 years out of date and 20 years behind their Continental colleagues who have now come round to the view that hard work and high production are essential for prosperity in contrast with British union claims for fewer work hours and higher pay.

THE CHEMICAL AGE welcomes the official publication of the facts as well as many of the opinions expressed in the White Paper, for they are in line with what we have been preaching during and ever since the depression of the early 1930's. While the facts are not in dispute, however, the principles require more searching analysis. The facts are simple. We have an effective labour force, divided between the military, industry, distribution, utilities, public service (*i.e.*, government) and so forth, of about 20 million people. Those people produce goods and services "to the value of well over £8,500 millions a year." Out of this must be provided all the goods and services required by our population of 45 millions, and in addition the goods and services supplied by us to the rest of the world.

In this country we are short of almost every commodity; we have to repair the ravages of war; we have to overtake the repairs and replacements that have been neglected since 1939. Above all we are dependent on exports to pay for the food and raw materials that we must buy from abroad; the realisation of so many overseas investments has so reduced our invisible exports that we must now sell abroad far more than we have ever done before. In the words of the White Paper, "above all, our national existence depends upon imports, which means that the goods we export in return must compete with the rest of the world in price, quality and design, and that our industry must adapt itself rapidly to changes in world markets." The over-riding facts are that at the present

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time there is a large excess of requirements over resources and that we are rapidly heading for bankruptcy because we are receiving from abroad far more in value than we can pay for by the goods and services that we export. Our deficit in 1946 was £450 million—a staggering sum, equivalent to £10 for every man, woman and child in the country.

What is the answer to this grave situation? The White Paper has been widely criticised on the ground that it does not put forward any constructive proposals for the solution of our difficulties. We doubt if that is its function. Scattered through the document are hints in plenty. Let us examine some possible steps.

First among these we place a sentence or two tucked away inconspicuously as if its authors were fearful of giving them prominence: "we shall not attain the objectives without an increase of output per man-year. . . . It is clear that there is room for improvement and that a relatively small improvement all round can have a big effect on the total national production. In the longer view increased output per man-year is the *only* way to expand production and the standard of living. The way to effect this is by the organised combined effort of men, management and machines."

Increased output, however, is not to be secured only by hard manual work. As the passage quoted above reminds us, it is also a matter of machines, and that includes plant. Without plant and machinery men cannot work. Without good plant and good machinery their output must be lower than it need be. It is on this score that we disagree fundamentally with the Government policy. It is inferred over and over again that because there is general scarcity we must choose what we would have and go short of the rest. That attitude has always been typical of the present government's policy. They have one motto only: "Ration." They legislate only for scarcity; never for plenty. Because of the shortages perpetuated by this policy, the will to work hard has departed from those who like to spend their money as they get it. It is not true to hold that because our labour force is limited we cannot increase production all along the line. Mechanisation can achieve astonishingly high outputs a man-year. In this country we employ about 3½ h.p. per worker; in America the figure is 6½. We have far to go before we are fully mechanised. We want the plant to do this. Mechanisation requires power; power involves coal and generating plant. The experience of this winter has proved to everyone that we have neither. It takes four years to build a power station to-day; it took two years before the war. Can't we cut the red tape now and build in two years? Coal, steel, plant, machinery—these are the necessities for high production. These should be the nation's highest priorities.

What else do we find? It is admitted in the White Paper that at a pinch we can do without more houses for a time, but that our national existence becomes quite impossible without enough coal and electric power. There is a vast programme of 300,000 new houses for 1947, but the amount of capital equipment and maintenance work (other than work on houses) is to exceed that of a normal pre-war year by only 15 per cent. Surely new plant and machinery for use in this country should now come first. Give us the means for high rates of production, then we can produce the goods. The chemical industry is called upon to increase its exports. But at the same time a large part of the chemical plant made in this country is being exported. Which is better: to export a plant or to build the plant for ourselves and go on exporting the chemicals it produces year after year?

When we have increased the rate of production, we must not allow our increased income to be frittered away in increased wages or profits. Low cost of production is and will remain a matter of first importance in our export drive. We hope that everyone will take to heart a passage in the report which emphasises this fact: "It is essential that costs and prices should be held steady and if possible reduced and therefore that, while the Government adheres to its long-term objective of raising the standard of living of the people, any further general increases in wages and profits must be accompanied by a corresponding increase in production."

We are pleased that the Labour Government has at last been converted to the view that a halt must now be called to the demands for higher wages unless there is a correspondingly increased output. But the government itself has to bear a large part of the blame for the workers' belief that they can continue to receive higher wages for less work. For years the Labour Party has been feeding the worker on pro-

paganda to the effect that employers were making fabulous fortunes while the workers were being exploited. It will be difficult for the workers to get accustomed to the idea that the pockets of the employers (whether they be State or private) are not bottomless, and that there is a limit, set by inexorable economic laws, to the wages which can be paid to them.

There is one way, however, in which increased wages can be obtained by the workers. That is by a return to piece-work. In many industries the system of hourly or weekly rates of pay shields the lazy worker, the dead-wood of industry, who obtain as much money as the hard-working and conscientious man. A return to piece-work in these industries, would, we think, quickly show increased production both from the good workman, who would be able to earn and produce more, and also from the work-dodgers who would have to put their backs into it so as to earn a living. We know the unions are vehemently opposed to the idea of piece-work, and we appreciate some of their objections. But this is no time for finicky tinkering. The unions must give as well as receive. On the government side, no more mistakes must be made, and no industrial conflict allowed to develop.

Nothing less than our existence is at stake. There is now no place for industrial arrangements which restrict production, prices or employment. Henceforth we must plan for high production and plenty. More people must be put into productive work. The greatest single change in our population is an increase in the number of "Public Services," which includes the Civil Service, from 1,465,000 in June, 1939, to 2,130,000 in December, 1946. Why not make a start by putting 700,000 of these back into industry? Stop nationalisation and put first things first. But above all, industry says to the Government: "Give us the tools and we will finish the job."

NOTES AND COMMENTS

AFRICAN LEAD PROSPECTS

THE suggestion made here recently that the opening up of new areas of Tanganyika and other African territories by the Government scheme to produce groundnuts on a vast scale is capable of conferring on British industries benefits unconnected with an improved supply of vegetable oil is confirmed in the course of a detailed survey of one of the groundnut regions by the *South African Mining and Engineering Journal*. Tanganyika, in addition to the well-developed gold and diamond mining industry—of which the latter's exports in the first half of last year were worth £521,000—has large and only partially developed resources of mica of several kinds, of tin, which would have been much more fully exploited had there been proper communications, and of kaolin, coal and lead. The last is probably the most important of all, in the light of the recent discovery in Western Tanganyika of lead ore deposits, estimated to be the largest found anywhere in the last 20 years. The potential output of lead from this one region has been provisionally valued at £750,000 a year and other minerals in the area are expected to yield an equal value when new roads and docks have been built.

VERY PRIVATE ENTERPRISE

AS a mental vacation from such topics as man-power and fuel problems, involving strings of noughts or as many asterisks for their expression, it is agreeable to dwell in thought for a while on Mr. Wheatley, and Mr. E. J. Johnson. The former, according to *The Times*, has been for 12 years manager, engineer, stoker, meter collector and general clerical assistant of the Wedmore gasworks in Somerset; Mr. Johnson when he was last in the news five years ago was reported to have combined much the same multiplicity of functions in one person at the Leyburn (North Riding) gasworks. And, lending some credence to the adage that it never rains but it pours, there is news of the existence of yet a third of these versatile gas men whose duties, before he retired not long ago, included sitting on top of the gasholder (with an armchair and the Sunday paper) to ensure that local gas pressure was equal to the job of cooking the weekly roast. We have yet to hear of a chemical manufacturing plant run as a one-man undertaking and, recalling some vast "chemical cities" in the North West, with their own power, light, roads and railways, we are not very hopeful that we shall. But this conception of undivided responsibility and unwavering

C

UNDER an order of the Ministry of Fuel and Power, THE CHEMICAL AGE was obliged to cease publication for the two consecutive issues which should have appeared on February 22 and March 1. All subscription orders are therefore being extended by two weeks; for the price of the annual subscription, therefore, each subscriber will receive the 52 issues of the journal for which he contracted.

Invoices for renewals falling due during the month of March, however, had already been prepared before the February crisis. In view of the very large number of accounts involved and the urgent need to save paper, these are being dispatched without alteration and such subscribers will receive their extensions, as promised above, during 1947/48 instead of immediately.

trustworthiness suggests another engaging aspect of private enterprise in the ultimate degree, of which the only common parallel is (or used to be) in Wales where " Mr. Jones the Milk " and " Mr. Lewis the Bread " were indispensable characters. At first sight there seems to be a faint resemblance to this one-man economy in the person of the Minister of Fuel and Power, busily occupied making optimistic or pessimistic speeches, wooing the miners, crowning Queens of the Coal, and abusing the gas and electricity industries for letting him get them into a mess, while he was working out details for the nationalisation of both.

CHEMICAL HUMOUR

DURING a discussion of humour, a chemist of our acquaintance assured us that there was no such thing in chemistry. We were not convinced. We thought there was plenty of unconscious humour to be found in chemical laboratories and works. We resolved to hunt it out for the amusement and perhaps instruction of our readers. With this end in view we obtained the services of Harold, the lab boy, and Professor Peptic, who make their bow at the foot of this page. The help of other personalities, whose activities will likewise be portrayed, have also been obtained in this search for chemical humour. If you recognise some of the characters as belonging to your particular laboratory or chemical works, we can assure you the likeness is purely coincidental. But if they do think and act as the newcomers to this journal, why not tell us about their activities? Send along their jokes, the amusing situations (although they may not have seemed funny at the time) and the mistakes they make. We will illustrate them and serve them up for the entertainment of your fellow-readers.

Harold: ***I haven't smelt this one yet!***

Synthetic Glycerine

Manufacture in U.S.A.

THE Shell Chemical Company of America has announced plans for the construction of a synthetic glycerine plant at Houston, Texas. The basic raw materials will be propylene, chlorine and caustic soda.

For some years now, according to *Chemical Industries*, the Shell company has produced pilot plant quantities of glycerine by the closely controlled chlorhydrination of allyl chloride (made by the high-temperature chlorination of propylene or allyl alcohol) and the hydrolysis of the chlorhydrins to crude glycerol.

The crude glycerol solution is then evaporated, first in flash evaporators to about 85 per cent concentration, then distilled under vacuum to 99 per cent plus. At a suitable point in this rectification, purification by solvent extraction with xylene or some such solvent is carried out.

The commercial production of this chemical may lead to new and wider uses for it.

A Century of Chemistry

Commemoration of First Meeting of Chemical Society

AT a joint meeting of the Royal Society of Arts and the Chemical Society at the Royal Society of Arts on February 19, to commemorate the first meeting of the Chemical Society, which took place at the Royal Society of Arts in 1841, Sir Harold Hartley, K.C.V.O., M.C., F.R.S., reviewed chemical progress in the past hundred years.

He pointed out that the Society was founded just over half a century after Lavoisier had given chemistry its modern form and laid down the first clear distinction between physical and chemical change. Dalton's atomic theory soon followed, and made possible the work of Berzelius, the great Swede, who for twenty years dominated chemistry, determining the atomic weight of every known element and the composition of many compounds.

Laying the Foundations

The younger chemists, Liebig, Wöhler and Dumas were laying the foundations of organic chemistry by making series of derivatives from natural products. By 1841 the authority of Berzelius was seriously challenged, and at the moment when the Chemical Society was founded there was a drift from theory towards empiricism. The next twenty years were ones of bitter controversy, the older chemists resenting criticism and the younger men like Gerhardt and Laurent suffering persecution for their views.

Each year brought an increasing harvest of new compounds, and the great need was for some new system of classification. Gerhardt attempted this with his type theory, in which all organic compounds derived from water, hydrogen, hydrochloric acid and ammonia. Kekule's theory of atom linkage enabled him to assign definite structures to organic compounds, and in 1860 Cannizarro's treatise led to general agreement on atomic weights and the number of atoms in a molecule.

During the next forty years chemistry advanced on a wide front in the organic, inorganic and physical fields. Many new substances and natural products like alizarin and indigo were synthesised in the laboratory, and between 1856 and 1900 the number of known organic compounds rose from 3000 to 200,000.

In 1860 only 60 elements were known and little progress had been made in their classification. In the eighties, thanks largely to van't Hoff, Ostwald and Arrhenius, the new subject of physical chemistry took shape. Then a quick succession of discoveries gave chemists a new conception of the nature of the atom. Roentgen's discovery of X-rays in 1895 was followed by Becquerel's discovery of radioactivity in 1896, J. J. Thomson's discovery of the electron, and Madame Curie's isolation of radium in 1898. This work was interrupted by the war of 1914, when chemists first played an important part in the military effort.

Since 1918 chemistry has progressed on a wide front with outstanding success in the fields of atomic and molecular structure, nuclear physics and isotopes, of the kinetics of chemical action and of the organic chemistry of living processes.

In the field of organic chemistry the outstanding work since 1900 has been on the materials and processes of living organisms. New techniques—X-rays, chromatography, the ultra-centrifuge, microchemistry—have made possible the investigation of minute quantities of substances. X-rays were of decisive help in elucidating the structure of the main constituents of living organisms, the polysaccharides and the proteins, and work on the structure of proteins is beginning to reveal the processes of growth. Our knowledge of the enzymes, vitamins, hormones and auxins has advanced rapidly, and the identification of the vitamins had been of profound importance in nutrition. The isolation and in some cases the synthesis of the hormones has been of great value in curative medicine.

Vital Discoveries

Triumphs in the chemotherapeutic field include the discovery of salvarsan in 1910 and more recently of the sulphonamides and penicillin. DDT and Gammexane are synthetic insecticides of outstanding effectiveness.

The chemical industry in 1841 was still mainly concerned with the manufacture of acids and alkalis, with the extraction of sugar and dyestuffs and with various fermentation processes.

Perkin's discovery of mauve in 1856 started a new industry, and later the displacements of natural by synthetic products such as indigo foreshadowed the future; synthetic drugs were soon added. In developing this new field Germany took the lead.

In the heavy chemical industry Ludwig Mond's successful development of the Solvay process in 1873 was the decisive episode in chemical engineering.

The demand for artificial fertilisers was a great stimulus to the industry, while electrolytic methods made possible the produc-

tion of metals like aluminium, magnesium and sodium. One part of the industry grew round the demands for new explosives, and another round the peaceful uses of cellulose products.

In the war of 1914 the chemical industry was a decisive factor in the supply of explosives and fertilisers. The Haber process for making ammonia made possible Germany's long resistance to the blockade.

In the inter-war period there was not only great progress in the development of synthetics to replace natural products, such as nylon and synthetic rubber, but also in the processing of vegetable and other foodstuffs —developments of great significance, since through them industry is drawing on the revenue account instead of the capital account of the world's resources.

During the second world war chemical industry proved its ability to produce whatever was needed from the available raw materials. Developments in the petroleum industry were outstanding, and finally chemical engineering made possible the production of the materials needed for the atomic bomb, and has opened up vistas of the use of atomic energy for peaceful purposes.

Concluding, Sir Harold Hartley said in all branches of chemistry we look back on a wonderful century of progress, in which men of many countries worked with a common aim. Yet it is well to contrast their achievements with the state of the world to-day. How can we apply the knowledge chemists have won to solving world-wide malnutrition, an endemic disease, he asked? How can we ensure that the same effort is devoted to the well-being of the world as made chemistry such a potent factor in war?

Fuel Economy in Small Factories

"FUEL Economy in a Small Factory" was the subject of a paper read to the Institution of Chemical Engineers, North-Western Branch, in Manchester, by Mr. V. G. Jenner, B.Sc., who cited the case of a factory which hydrogenated fish and vegetable oils for the manufacture of margarine and soap. In 1939 the weekly consumption was 110 tons of boiler slack, 15 tons of coke for the production of producer gas, 45,000 units of power and 1,100,000 gallons of town's water; a fuel economy campaign resulted in a continuous saving of coal which reached 1100 tons during 1945 and only one, instead of two, 8 ft. 6 in. by 30 ft. Lancashire boiler was required to produce 10,200 lb. of steam at 120 lb. per sq. in., the steam : fuel ratio being 6.9 : 1 by weight.

Means of Saving

The first economy of 280 tons per year of coal was gained by replacing the engine driving the boiler fan by a 25 h.p. motor. Efficient steam distribution was obtained by throttling valves and by a balanced steam consumption in the process work. A further economy of steam used in the coils to prevent the solidification of hardened fats in the pipe-lines was obtained. All mains and equipment were maintained at greatest efficiency, waste hot water was used where possible and oil storage tanks were lagged. The theoretical and actual consumption of steam were compared, using a base temperature for the raw materials and the actual fuel consumption per 1000 B.Th.U. obtained. A more detailed heat balance showed that 450 lb. per hour of steam could be saved by the greater use of steam condensed during process heating. The gas producer was overhauled, worn parts replaced, and was then worked with improved efficiency. Attention was given to the efficient heating of reaction vessels by steam coils, to the steam traps on the vessels and to the radiation losses from the oil storage tanks.

Factories Allocated

Among firms to which Government factories have been allocated are the following: Tungsten Manufacturing Co., Ltd.; (5790 sq. ft. at Highgate, London; proposed production, tungsten wire); British Drug Houses, Ltd. (107,500 sq. ft., Poole; laboratory chemicals); British Metal Powders, Ltd. (5950 sq. ft., Reading; aluminium and bronze powders); J. M. Collett & Co., Ltd. (4230 sq. ft., Gloucester; processing of sodium sulphate); R. S. Harrison, Ltd. (7200 sq. ft., Llanthony, Gloucester; brass and aluminium founders); Williams (Hounslow), Ltd. (110,500 sq. ft., Burn Hall, near Fleetwood; dyestuffs and chemicals); I.C.I., Ltd. (28,5000 sq. ft., Clitheroe, Lancs.; catalysts); Dunlop Rubber Co., Ltd. (37,480 sq. ft., Manchester; rubber lining of acid tanks); Crossley Bros., Ltd. (93,500 sq. ft., Openshaw iron founding); I.C.I. (Plastics), Ltd. (62,400 sq. ft., Rawtenstall; plastics); Heyden Chemical Corporation (95,000 sq ft., Ardrossan, Scotland; penicillin and fine chemicals); B.X. Plastics, Ltd. (part of 50,000 sq. ft., Dundee; plastic moulding powder); International Alloys, Ltd. (84,450 sq. ft., Maghaberry, N. Ireland; smelting aircraft scrap).

Dehydration with Activated Alumina

ACTIVATED alumina is capable of absorbing moisture from gases and vapours at substantially 100 per cent adsorptive efficiency. Such efficiencies can be obtained commercially with adequately designed and properly operated equipment. The degree of dryness of a gas is sometimes expressed in terms of its dew point. A gas with a dew point of −40°F. is considered commercially dry. However, in large scale production equipment, activated alumina readily dehydrates gases to dew points below −76°C. (−105°F.) equivalent to approximately 0.0004 grain of moisture per cu. ft.

Commercial drying with activated alumina involves the flow of a gas through the adsorbent. To express adsorptive efficiency in terms of vapour pressure, it is necessary to employ dynamic methods of measurement. When using this procedure it is apparent that moisture is adsorbed initially at the gas-entrance end of the bed and that the activated alumina in this section approaches its saturation point before moisture reaches the gas-exit end of the bed. As flow continues, more of the activated alumina bed becomes saturated, and eventually in the vicinity of the exit-end the capacity of adsorption is no longer effective at substantially 100 per cent efficiency; thus a variable degree of saturation exists between the entrance and exit ends. Vapour pressures, therefore, must be expressed on the basis of the average percentage of moisture throughout the bed and the vapour pressure of water in the exit gas.

Heat Liberation

As moisture is adsorbed by activated alumina, heat is liberated. If this heat is removed, as by embedded cooling coils, activated alumina adsorbs moisture at 100 per cent efficiency until it has taken up between 12 and 14 per cent of its dry weight. Beyond this point, it continues to adsorb, but at decreasing efficiencies, until saturated, at which time it contains 20 to 25 per cent adsorbed water. If the heat of adsorption is not removed, a hot zone forms at the area of maximum adsorption. This hot zone follows the course of adsorption from the point where the gas enters the bed to the exit, and reduces the capacity of activated alumina to adsorb at 100 per cent efficiency to as low as 4 or 5 per cent of its dry weight. The quantity of heat liberated in the bed is a function of the concentration of moisture in the gas and the heat content of the gas, so that the necessity for cooling becomes greater with increasing moisture concentrations. However, when gases are dried at elevated pressures, the heat capacity of the gas is increased; more heat is carried from the bed and the necessity for cooling is decreased. For all practical purposes, the heat liberated during adsorption is usually considered as being substantially the same as the heat required to vaporise an equal amount of water.

In general, the total weight of moisture adsorbed at 100 per cent efficiency by the activated alumina in a given apparatus is nearly independent of the initial moisture concentration of the gas. With a gas of higher moisture concentration, a slightly greater total moisture adsorption at 100 per cent efficiency is obtained than with a gas of lower moisture concentration, but within the range usually encountered the variation will not be more than about 1 per cent. Therefore, the volume of gas dried is approximately inversely proportional to its initial moisture content.

Temperature Effects

The temperature of the gas being dried affects the adsorptive capacity of activated alumina, since the capacity decreases as the temperature of the gas increases. The best results are obtained when the bed temperature is between 32° and 80°F. Activated alumina is effective beyond this temperature range, even up to 212°F., but at higher temperatures, the adsorptive capacity is reduced markedly. Gases at temperatures above 90°F. should be cooled before entering the bed and any moisture condensed should be trapped out, thus reducing the burden on the activated alumina.

Although the adsorption of moisture by activated alumina is a surface phenomenon and takes place rapidly, an interval is required for the moisture to penetrate to the inner pores of the adsorbent. The duration of the contact between gas and adsorbent has a bearing upon the efficiency of adsorption. The contact interval is governed by the rate of flow, therefore higher flow rates tend to decrease the adsorptive efficiency and capacity. Flow rates approximating 10 to 20 cu. ft. per hour per lb. of activated alumina are suitable for the complete drying of commercial gases. Higher flow rates can be employed when the application does not require complete drying of the gas.

Because of their greater external surface area and the greater accessibility of the internal pores to the gas, the smaller sizes of activated alumina are more effective than the larger sizes. Experience has shown that there is little practical difference in this respect between the two sizes which are

commonly used, 4 to 8 and 8 to 14 mesh.

Increasing the height of a bed of activated alumina increases the percentage of moisture adsorbed at a given efficiency. In general, a height equal to three or four times the diameter is well suited for the complete removal of moisture. These dimensions may be changed to meet other requirements, such as lower resistance to flow. For mechanical reasons, a two-tower system is sometimes preferred to a single tower of double height.

A cylindrical metal container makes a satisfactory drying tower for activated alumina. The granules should be supported at the bottom of the tower on a corrosion-resistant metallic screen. Activated alumina has sufficient compressive strength to prevent crushing and packing and no intermediate supports are required. The gas to be dried is introduced either at the bottom or the top of the tower. If velocities are high, an upward flow of gas may float the particles, and the resulting abrasive action of the moving particles will cause some dusting; a downward flow of gas is preferable. For reactivation with hot air or gases of combustion, it is desirable that the flow be opposite in direction to that during adsorption, so that if reactivation is incomplete, residual moisture will be left in the activated alumina at the moist gas inlet, and not at the dry gas outlet.

For most purposes, steel drying towers are satisfactory. When drying gases that cause corrosion, it may be necessary to protect the steel by galvanising or other coatings, or to use aluminium, Monel metal, or some other material that is resistant to the corrosive conditions to which the towers are subjected. The towers should be insulated to conserve heat during reactivation. Aluminium foil insulation, because of its adaptability and low heat capacity, has been found especially suitable for this purpose.

When gases contain foreign particles such as dust, soot, and carbonaceous products, better results can be obtained if such impurities are first freed from the gases. No particular loss will be experienced initially from the standpoint of moisture adsorption, but after repeated reactivations, the accumulation of these impurities in the voids will increase the resistance to flow.

When activated alumina ceases to be effective for the adsorption of moisture, it can be revived by the application of heat to vaporise the adsorbed water.

Reactivation, or desorption, is carried out generally at temperatures between 350° and 600°F. Part of the water is driven off at temperatures as low as the boiling point of water, but a temperature of at least 350°F. is required for complete reactivation. At higher temperatures, less time is required. Temperatures above 600°F. permanently impair the adsorptive properties of activated alumina. After reactivation, activated alumina is comparable in every way to the original product.

The following methods of reactivation are in use, the principal differences being in the method of supplying the heat to the bed:

(1) Circulation of preheated air or other gas.

(2) Circulation of the combustion products of an inflammable gas or oil.

(3) Embedded electrical resistors.

(4) Embedded pipe coils for circulation of steam or hot oil.

In the first method, air or other gas, such as carbon dioxide or nitrogen, is heated externally and circulated through the tower, preferably in the reverse direction to the flow of gas during the drying period. In order to utilise hot gaseous products of combustion, it is necessary to dilute or otherwise cool them to the reactivating temperature range. When embedded electrical resistors or pipe coils are employed, a current of gas should be passed through the tower or a vacuum should be applied to carry off the released moisture.

Oil from Natural Gas

Plan for Synthesis in U.S.

THE Stanolind Oil & Gas Co., an affiliate of Standard Oil Co. (Indiana), is considering plans for a large commercial-scale Synthol plant to synthesise oil from natural gas. The plant will probably be set up in the Hugoton gas field of south-western Kansas which has estimated reserves of 23 trillion cu. ft. and is the largest gas field in the U.S. About 100,000,000 cu. ft. per day of gas will be processed, yielding approximately 6000 barrels per day of high-quality petrol and 1000 barrels of distillate fuels.

The Hugoton plant is being designed to process gas of low heating value, unsuited for sale as fuel gas. An extensive pipe line gathering system and a natural petrol plant would provide the dry feed gas, which is burned under 300 lb. pressure with oxygen to yield synthesis gas with a composition controlled to within narrow limits. Oxygen is to be produced by fractionating liquid air.

For each 15,000 cu. ft. of gas charged to the plant, one barrel of crude synthetic oil and substantial amounts of oxygenated compounds (including alcohols, ketones, aldehydes, and acids) are produced. The synthesis reaction is carried on under pressure in large fluid type reactors utilising a special powdered iron catalyst.

One step of the Synthol process is based on the Fischer-Tropsch synthesis principle.

TRANSJORDAN MINERAL RESOURCES

Commercial Possibilities

SOME speculation has followed the signing of the Turco-Transjordan treaty and the report that an economic agreement is also to be concluded. In some quarters it is considered that the moves foreshadow the development of Transjordan which, though not rich in minerals in the ordinary sense, does possess several minerals, metallic and non-metallic, in commercial quantities, and has unique resources in the occurrence of mineral salts in the Dead Sea, the possession of which Transjordan shares equally with Palestine.

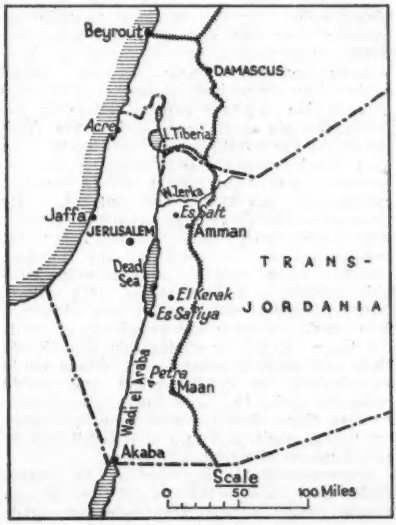
Iron ore deposits exist in the Zerqa and Ajlun regions. At Mugharat el Warna they were once worked by the Crusaders, as is proved by an old furnace below the Crusader Castle of Ajlun and the existence of about one kilometre of road made from the slag. But since that time little prospecting or development has been made which would give further information on the exact quantity or quality of these deposits. There appear to be several exposures spreading over a wide area, the principal known mine being at Tel Ekweder—the only one that has been more closely examined. There two varieties of ore exist, one of a hard compact kind, black to dark brown in colour, the other more ochreous or limonitic. Analyses showed that the hard compact ore is essentially a haematite of good quality, almost suitable for the manufacture of steel by the acid process, while the ochreous variety contains not only calcareous but also siliceous matter. Workings which have been experimentally driven show that at the examined level the amount of ore would probably not exceed about 200,000 tons of the better and the same amount of the inferior quality. It is considered that a market could be found if cheap transport existed or if the deposits, on prospecting, were found to be sufficiently large. South of Petra, a vein of pure haematite exists, traversing the sandstone. The vein is from 5 to 30 c.m. in thickness, but the occurrence does not suggest quantity in depth.

Quality if Not Quantity

Copper is found in the region between Safiye and Feinan, mostly in the form of veins containing cuprite and malachite. Some of the ore attains a high quality, but the prospects of finding it in quantity are not promising. Manganese ore occurs in the Wadi Dana, at the base of the sandstone formation. During the war it was worked for the first time and small quantities of pyrolusite, containing up to 75 per cent of manganese dioxide, were made available for industrial use in Palestine. Investigations in the Wadi Dana area show that the ore, which is of a high grade, exists in quantities under easily workable conditions.

In the Zerqa Main area, on the plateau which can be seen from the main road, good yellow ochre was found, though exposed in small quantities only. Analyses have not been made as the quality was too variable, but the material was ground and tried satisfactorily for colour and covering power. Minor deposits of ochre also occur at various places near the River Zerqa and in the lower Jordan Valley. Of late some of these are being worked and the output, so far only a few hundred tons per annum, is sold in Palestine.

Early this century widespread phosphate deposits were known to exist at different places in the neighbourhood of Amman (the capital), Es Salt and el Hasa. In 1911 the Turkish Government granted a concession for the exploitation of the Es Salt stratum to a Turco-Italian group which, however, never exercised its rights. Under the new administration an exploration permit was given for the Amman area to the Transjordan Phosphate Company and resulted in the discovery of rich deposits running into millions of tons in the neighbourhood of Roseifa, on both sides of the Hejaz railway.



There are four beds in this area, varying in thickness from a half to two metres, with an average content of 70 to 75 per cent of tricalcic phosphate. In quality it compares favourably with the North African phosphate and, being of a pulverulent form with but little overburden, is easily mined out either by open-cast quarrying or by horizontal tunnelling. The war caused the exploitation of these deposits to be started sooner than would normally have been the case. When Palestine agriculture faced a shortage in fertilisers, phosphate from Transjordan was brought to Palestine and, under a scheme supported by the Palestine Government, production of a super-phosphate fertiliser was begun in 1941. In 1942 3200 tons of raw-phosphate were exported from Transjordan to Palestine, but in 1943 and 1944 the figure reached 5000 tons per annum.

Bituminous Deposits

A pure bitumen is found floating on the Dead Sea and deposited at various points of its shore, but it is estimated that it would amount to less than 100 tons a year or a quantity too small to form the basis of an industry. The source of this bitumen is unknown, but even if it were discovered below the water level and feasible means for its extraction devised, costs of production would in all probability be too high for its profitable exploitation. Bitumen is also found impregnating the Nubian sandstone east of the Lisan and south of the Mojib, but again it is doubtful whether these reserves could be economically exploited.

Deposits of bituminous limestone are fairly widespread both in Central and Northern Transjordan. In the Yarmuk triangle exposures over 100 metres in thickness are found with considerable varieties in bituminous content. These deposits extend under the chert beds which cover North Transjordan and are exposed again in the Wadi Shellala in the east and in the Wadi Araba in the south, where they occur in a very black variety which contains over 20 per cent bituminous matter with 3 per cent inflammable gas and 9 per cent oil. By destructive distillation at atmospheric pressure it was also possible to collect 9 per cent crude oil from a sample of the Yarmuk variety; when carefully heated under suitable conditions and extracted with chloroform, 17 per cent crude oil was obtained. The results indicate the possibility of heating these bituminous chalks economically for their oil product, whereby quicklime could be obtained as a by-product and would certainly make the area worth prospecting. It was there that German army engineers erected a small plant for the distillation of petroleum in the first world war.

Experimental drilling for oil in Transjordan goes back to the time of the Ottoman régime, when a first bore hole was made under the supervision of British mining engineers by the Syrian Exploitation Company in 1912-13. Prospecting was resumed after the war on an enlarged scale by the Iraq Petroleum Company, principally in the Ghor and Dead Sea region, but little has been published on the outcome of these researches.

Extensive deposits of gypsum exist in south-western Transjordan, near the Dead Sea. The first bed of a satisfactory thickness for development was located at Wadi Hasa, west of an old volcanic neck. Later a block of gypsum was found by chance in the Wadi Kerak by cutting through it in order to make the new motor road from Kerak to the Ghor el Mezra on the Dead Sea. This led to further prospecting and the eventual discovery of rich deposits in this area. The best exposed gypsum is found about 60 metres above sea level and continues with a thickness of about two to three metres for many kilometres along the steep cliffs which form the boundary of the wadi area. On the south side it is seen at Tel Umm Sidri, where the thickness is reduced to one metre. It would appear a feasible proposition to work this gypsum. The distance from the Dead Sea is about 10 km., but it would be easily transported and developed by means of a rope railway, as there is a drop of about 450 metres (1500 ft.) and no fuel would be required for motive power.

Clay and Silica discoveries

A white clay, similar to kaolin, is found in the Mahis region, west of Amman, and is used by a number of Palestine factories, engaged in the manufacture of pottery and ceramic ware, and in the production of aluminium sulphate, while a second similar variety from Safut serves as a raw material to the only local pottery, which was recently established at Suweile. In this promising branch of mining, which includes also the extraction of a fire-clay at Esh Shuna in the Jordan Valley, about 70 people are employed; exports of clay to Palestine have risen from a few hundred tons in 1941 to 3000 tons in 1943.

Of late, Transjordan also supplies silica sand from the Mahis region to Palestine, which is used in the production of abrasives, cleaning powder and fire bricks and has succeeded in replacing a foreign silica formerly employed in the manufacture of artificial teeth. A pure white sand found near the terminus of the Hejaz railway in South Transjordan has proved suitable for the production of plate glass, but its economic exploitation will, even more than that of other Transjordan minerals, depend on the introduction of a progressive freight tariff policy by the railway administration.

GERMAN PAINT INDUSTRY

Review of F.I.A.T. Final Report 681

THIS report is issued with the warning that if the subject matter should be protected by British and/or U.S. Patents or Patent Applications, this publication cannot be held to give any protection against action for infringement.

The summary of German trade names which is listed at the beginning of the report is useful not only for the study of this particular publication but also in the reading of related (*i.e.*, Plastics) reports.

For pigment grinding purposes it appears that stone mills are almost entirely replaced by ball or roller mills. Usually double roll mills are used but for hard pigments the triple roll type are employed.

New Types of Pigments

Of the new types of pigments prepared in Germany, lead cyanamide is of considerable importance. This is used as a rust-inhibiting pigment and is manufactured by reacting calcium acid cyanamide with lead nitrate and calcium hydroxide. The reaction is quoted as follows in the report but it will be noted that this does not balance:

$$2Pb(NO_3)_2 + Ca(HCN)_2 + Ca(OH)_2 \rightarrow 2PbCN_2 + 2Ca(NO_3)_2 + 2H_2O$$

Presumably calcium acid cyanamide should be represented as $Ca(HCN_2)_2$.

The pigment is light yellow in colour, reputed to be soft settling and forms less brittle films on ageing than does red lead. A disadvantage of the material however is that it has more than double the oil absorption of red lead and takes a longer time to dry.

"Silcar," a pigment used for anti-corrosive paints, is also of importance. It is stated to contain silica and silicon carbide, the percentage of the former slightly exceeding that of the latter. "Sigal" is an alloy of 90 per cent aluminium and 10 per cent silicon which is used for non-reflecting surfaces; its good weathering properties are worthy of note. "Sigal" is normally used in conjunction with phenolic binders. Elemental silicon is also used for similar purposes.

Several shellac substitutes are available in Germany and two will be of particular interest to British manufacturers. The material produced by Wacker is prepared by inter-condensing acetaldehyde and higher aldehydes. After distilling, the products are treated with ozone. The most widely used shellac substitute is a highly condensed resin prepared from phthalic anhydride and glycerine.

Alkyds are produced in greater bulk than the other synthetic resins for the paint industry. The polyhydric alcohols employed, in their respective order of importance, are: glycerine, pentaerythritol, 1.1.1. trimethylolpropane, 1.3.5. hexanetriol with small amounts of 2.3.5. hexane triol.

Benzyl cellulose is an important ingredient for coatings in view of its high water resistance, its principal use being in coating compositions for ships, buoys, and docks. Methyl cellulose is also used as an ingredient in emulsion paints.

An emulsion paint binder called "Membranit" is claimed to have a greater degree of durability than oil bound paints It is easily applied by brushing and can be used for interior or exterior work. A disadvantage of this material is that high gloss coatings cannot be produced from the formula, which is given as follows:

44.00	Alkydal T (51 glyceryl phthalate and 49 per cent linseed oil).
3.50	Casein.
2.50	Montan wax acid.
1.30	Driers (lead and magnesium naphthenates).
0.56	Borax.
1.60	25 per cent ammonia solution.
46.54	Water.
100.00	

Pigments are then added to produce the finished composition.

Useful Formulæ

Many other useful formulæ for emulsion type paints are also included in the report.

A typical formula for an interior glossy white finish for plaster is:

15	per cent Mowilith D.32
15	per cent Mowilith D
10	per cent Kaolin
10	per cent Lithopone Red Seal (50 per cent zinc sulphide)
5	per cent Talcum
2.5	per cent Titanium dioxide
2.5	per cent. Barium sulphate
40	per cent Water
100.00	

Polyvinyl acetate is used in the production of emulsion paints with polyvinyl alcohol as the emulsifier.

The following grades of Mowilith emulsions (polyvinyl acetate derivatives) are used in the German paint industry.

Mowilith D—50 per cent solids with no plasticiser.

Mowilith D.32—58 per cent solids consisting of 38.7 per cent. polyvinyl acetate, 1.9 per cent polyvinyl alcohol, 11.6 per cent tricresyl phosphate, 7.7 per cent dibutyl phtha-

late, 3.3 per cent alcohol and 36.8 per cent water.

Mowilith D.300—An emulsified copolymer of 30 per cent polyvinyl chloride and 70 per cent polyvinyl acetate, plasticised with either dihexyl or dioctyl phthalate and dibutyl phthalate. Water and a small quantity of methanol make up the remainder of the composition.

An interesting section is devoted to the polyacrylic ester emulsions but space is too limited for this subject to be dealt with in this review. Nitrocellulose lacquers are combined with polyvinyl ethers for use as primer coats on metal surfaces.

The German plasticised phenolic resins are of considerable interest to this country, especially at the present time, while the supply position of linseed oil is so difficult. According to the report there are three main types of such resins: Lupen AM—a very hard resin consisting of 7 parts of P/F condensate with 3 parts of adipic acid/trimethylolpropane complex. Luphen AT—a softer resin consisting of equal parts of the P/F condensate and adipic acid/trimethylolpropane complex. Luphen AW—is the softest of these resins and consists of 4 parts P/F condensate and 6 parts of the complex.

Unfortunately, this report does not give any details of the plasticised phenolics produced by the Albert Werke, known under the generic title of Durophen. The report under review gives an adequate description of the urea based coatings. Phosphoric acid is the catalyst used in the cold air drying urea finishes

Anti-fouling coatings are also considered in this report. Certain differences of opinion are apparent with regard to the best type of anti-fouling agent but in general it appears that cuprous oxide is most favoured. Dr. Kurt Herberts, however, told the investigators that fine electrolytic copper is superior to cuprous oxide for use in anti-fouling paints. The Germans have apparently tried all the more usual types of materials which are well known to British manufacturers.

Some mention is made of the Desmodurs and Desmophens, but fuller accounts can be found in other reports, *e.g.*, the B.I.O.S. final report "Manufacture and Use of German synthetic adhesives and raw materials."

Before closing this review a reference must be made to the German heat resisting paints such as the I.G. product "Shambit." A mixture of pigments is first prepared to the formula: 15.7 per cent aluminium oxide, 78.0 per cent synthetic red iron oxide, 6.3 per cent Kaolin, and to this is added a small quantity of phosphoric acid containing a trace of the reaction product of ammonium thiocyanate and aniline hydrochloride. This mixture, when brushed out on metal is stated to withstand a temperature of 500°C.

B.I.F. Records

British Industries Fair

ALLOCATION of space for exhibitors at the first post-war British Industries Fair, to be open from May 5 to 16, has now been completed and 3131 manufacturers—a record since the Fair became an annual event in 1915, being nearly a thousand more than in 1939—will occupy some 835,000 sq. ft. at Olympia, Earls Court and Castle Bromwich, Birmingham. So numerous, indeed, were applications up to the closing date in September that, had accommodation been available, more than one million sq. ft. could have been filled. As recorded in our issue for January 4, page 20, 89 manufacturers of chemicals applied for an aggregate of over 27,000 sq. ft. of space and their stands will be found at the entrance to the Grand Hall at Olympia.

The Scientific Instrument Section is to be a composite stand covering nearly 14,500 sq. ft. in which 86 firms, under the auspices of the Scientific Instrument Manufacturers' Association of Great Britain, Ltd., will display scientific instruments of almost every type. Adjoining, over 40 firms, not members of the S.I.M.A., have booked a further 6000 sq. ft. But, in order that the display may be comprehensive and fully representative to the industry, all the firms exhibiting have co-operated to leave the arrangements in S.I.M.A. hands. Thus, 20,000 sq. ft. will be devoted to the display of British scientific instruments—more than three times the space taken by the industry at the last Fair in 1939.

"Drowsy" Cleaning Fluid

A FATAL accident inquiry in Glasgow Sheriff Court recently disclosed that a cleaning material used in a city hosiery factory made girl inspectors feel "drowsy" when they used it.

The inquiry concerned the death of a 15-year-old girl employee of the firm, The Grange Knitwear Co., 299 Bell Street, Glasgow, who, after working late at the factory, collapsed and died at her home.

Another girl who worked beside the dead girl, indicated that it was their duty to inspect the finished garments and if any article was found to be soiled it was their job to clean it with a liquid which had a smell "like ether."

The manageress stated, however, that the liquid had been used for cleaning for about a year. Some of the girls had complained about feeling drowsy when using it. A notice was therefore given to the girls issuing instructions about ventilation in the room, but it was not exhibited.

LIQUID FUELS FROM NATIONAL SOURCES

Promising Investigations in France

THE Director of the Municipal Laboratory, Lyons, M. E. G. Voiret, continues his strong advocacy of a more rational and extensive use of indigenous resources as a solution of the acute fuel and power problem in France.* He now includes liquid fuels in his survey and is strongly of the opinion that France possesses in her own native mineral wealth, especially lignites and pyroschists (bituminous schists), more than sufficient raw material to supply fully all her own needs and provide at the same time a considerable output of fertilisers, sulphur, and other products. In *Chimie et Ind.*, November, 1946, pp. 423-8, he elaborates these suggestions at some length. He thinks they are much more likely to lead to practical results and be much cheaper than the search for petroleum, involving as it does deep and costly drillings, with the high probability of no success at the end. And imports on any sufficient scale at a reasonable price are problematical under present conditions. This also applies, in his view, to most synthetic fuels and substitutes, with the exception of methyl alcohol, which constitutes a special case, and merits consideration as a supplementary fuel under certain conditions.

Cheap Gas

As a preliminary to his main policy M. Voiret strongly urges the greater use of solid fuel in gas producers for agricultural purposes and in other directions where this particular type of power supply is suitable; but it would probably have to be accompanied by a great extension of mechanised farming through better organised co-operative agriculture. In any case there are many types of portable gas producers now available for traction purposes, and they are capable of burning almost anything. Certainly on the farms there should be abundant "fuel," in the form of waste material available. With more mechanised farming the consumption of the ordinary petrol might be one or two million tons; but however desirable and urgent such mechanisation may be it is quite certain that the supply of petrol would be insufficient. Tractors and other farm implements and certain types of road transport therefore should be adapted to run on gas producers which can burn all kinds of raw wood, farm waste, etc., or special types of fuel agglomerates made up of inferior coal, anthracite or the like.

The production of such agglomerates in fact is one of the methods suggested for the more rational use of lignite, especially of the Landes type. These deposits are in many places 4-8 metres thick, very often near the surface, with low ash content and practically no sulphur. After distillation this lignite would be ideal material for gas producer fuel blocks at a very low cost. The Landes area alone would probably supply all the portable gas producer fuel required other than that obtained from wood in various forms, carbonised or otherwise.

Coming to grips with his main problem that of liquid fuel, M. Voiret first of all rules out direct synthesis of the Bergius, Fischer and other kinds, as well as alcohol, with the exception of methyl alcohol—produced from the Fuveau lignites. There remain chiefly the lignites and inferior coals from which could be obtained: (a) gaseous fuel; (b) several million tons of liquid products from distillation, which could be hydrogenated into various grade fuels; (c) sulphur and nitrogenous fertilisers.

From the 50-60 million tons of lignite available it is estimated that some 3-5 million tons of crude liquid products could be obtained by gasification at low cost in comparatively simple apparatus; and from these excellent yields of high grade fuels, etc., could be obtained by hydrogenation. It is only necessary to apply well established practice and technique to these lignites with the requisite amount of intelligent organisation. And these, it should be remembered, would only be by-products in a large national gas industry. Yet the author appears a little dubious or pessimistic as to practical realisation of his ideas.

Toutefois, if faut dire également que la production des carburants par ce procédé est liée à l'extension même du procédé, c'est à dire en définitive à la création et au développement d'un réseau national de combustibles gazeux. Nous en sommes, là encore, au domaine de l'hypothèse, et l'initiative en cette matière est liée à trop de facteurs pour permettre la moindre probabilité. C'est pourquoi nous devons envisager parallèlement les autres possibilités de production de carburants liquides.

Other Alternatives

Two other possibilities are therefore presented: (a) synthetic methyl alcohol, and (b) the utilisation of asphaltic rocks and pyroschists. Both the synthesis (from carbon monoxide and hydrogen) and also the valuable "anti-knock" and other properties of methyl alcohol are well known by

* See THE CHEMICAL AGE, 18 January, 1947, p. 129.

now; and it is of course largely used in ways other than as a fuel or fuel constituent. It is of special interest in connection with M. Voiret's lignite schemes, for the necessary carbon monoxide and hydrogen may be removed from the lignite gas without greatly affecting its calorific quality. Nevertheless, synthetic methyl alcohol is still too dear at present for use in France otherwise than as an additive or stand-by; and therefore the author does not think a production of more than 5-600,000 tons would be desirable. He thinks this is the tonnage envisaged at Fuveau and certain other places where the particular type of lignite is thought to be most suitable from the synthetic alcohol point of view.

The bitumen in asphaltic rocks (5-12 per cent) may be extracted with solvent, while the hydrocarbons in pyroschists are recovered by distillation. Most asphalts, of which the total world production is about 600,000 tons annually, are used for road-making; but just before the war the asphaltic deposits at Ragusa in Sicilly were being used for production of liquid fuel—some 200,000 tons of heavy oil per annum.

Big Resources

There are in France, besides the rather limited asphaltic deposits of Bugey and Limague, the vast limestone asphalts of le Gard containing 8-12 per cent bitumen, in seams of considerable thickness, up to 10 metres, and covering an area of some 20,000 hectares (50,000 acres). As is well known, porous sedimentary rocks, such as sandstone or dolomites (calcium and magnesium carbonates) may be impregnated with up to 15 per cent asphalt and may be worth working on their own account apart from their bitumen or asphaltic content. At present the Gard deposits are only worked on a small scale. Other valuable asphaltic rocks are those of the Manosque basin, and both these and the Gard asphalts are found adjacent to or near lignite beds and could be obtained through the same shafts or workings.

But M. Voiret seems to think that the pyroschists or so-called (improperly) bituminous schists are of still greater interest as a source of fuel. France is well supplied with these also. They are thought to be the mother rocks for petroleum. Large and extensive beds are found at Autun, Buxière-les-Mines, Manosque, in Lorraine, Franche-Comtè, les Causses, Basse-Normandie, l'Aude, Dauphiné, etc. Notwithstanding some developments in Autun and l'Allier since 1940, it is not possible to say that these formations have been worked on any substantial scale from a fuel point of view; and this for various reasons. Principally, there are the hope of finding eventually some rich petroleum fields, of which the geological evidence is thought to be promising; the comparatively low content in crude fuel oil of these schists—so much lower than those of Scotland or Estonia; to which may perhaps be added lack of suitable labour and plant and fuel to work the latter.

Conditions in France, however, have changed since 1940, and experience at Grande-Paroisse, for example, where 500 tons of schist per day are treated in plant which requires no other fuel than the gaseous products of distillation, with a yield of 92-95 per cent, has shown that the suggestion is feasible and that suitable plant is available. This has been further confirmed in other countries, notably in Estonia. A closed circuit of still gases is used to heat the broken up schist, and reheating is effected by combustion of part of the gas not condensed or of the undistilled residue remaining in the schist after heating.

In this and previous articles the author seems to have made out a case for serious study of French possibilities of utilising (a) solid fuel such as wood and many forms of cellulosic waste, etc., in gas producers for agricultural mechanisation and other suitable directions; (b) lignites, inferior coals, etc., by gasification and/or distillation and hydrogenation; (c) asphaltic rocks and pyroschists by distillation, and (d) carbon monoxide and hydrogen from lignite gas or other sources for methyl alcohol synthesis. In addition to fuel, there would also be large supplies of lubricating oils, sulphur, nitrogenous fertilisers, and possibly other products apart from coke of various grades.

Rhodesia Copper Mines

Because of coal shortage, the Nchanga copper mine in Rhodesia stopped production of February 28, while at Rhokana smelting operations have been curtailed and all but one reverberatory furnace closed down from March 1. Drought conditions in Southern Rhodesia require the diversion of Northern Rhodesian rolling stock for movements of cattle and foodstuffs in Southern Rhodesia so that future coal deliveries are uncertain.

Poles for Iron Smelting Industry

Mr. A. Callighan, general secretary of the National Union of Blast Furnacemen, announced at Middlesbrough, Yorkshire, on Monday that an agreement had been reached between the union and employers over the use of Polish labour in the iron smelting industry. The conditions are, first, that Poles should be employed only if suitable British labour is not available; secondly, the total number of Poles shall not exceed 5 per cent of the firms' total number of employees, and, thirdy, that Poles employed at any particular plant shall not exceed 10 per cent of the employees on the books.

A PEAT INDUSTRY FOR SCOTLAND

Large-Scale Development Forecast

THE development of a 100 per cent mechanised peat industry in Scotland was visualised by Mr. Anders Tomter, Norwegian peat expert and at present an official of the Ministry of Fuel and Power when he addressed the Highland Development League in Glasgow.

While the major need at the moment is to develop peat as a fuel source, such development would permit the general utilisation of the chemical, insulation material, agricultural and horticultural production uses for which peat has been a proved raw material. The adoption of the largest scale mechanised methods are essential, Mr. Tomter said, if the economic operation is to be achieved, but he pointed to the fact that there was every scope for economic operation if a bold enough policy were adopted. He outlined experimental methods perfected in Dumfriesshire, but not yet worked on a commercial scale in Scotland, although adopted elsewhere with conspicuous success.

By this method there is horizontal cutting as opposed to vertical cutting which has been generally used in all Continental countries.

The practice follows very closely on agricultural methods in that the bog is first ditched by a tractor drain ditcher on which a rotating disc cuts a 3 ft. deep and 3 ft. wide ditch at the rate of 80 yards an hour over ground containing up to 93 per cent of water. For economic working the bog must be at least 1000 acres and contain an output of 50,000 tons per annum. The bog is divided into fields of 50 ft. wide by a mile long and each traversed by a tractor with a 10 ft. long 12 in. diameter drum spiked to tear the peat. The drum revolves at 460/800 r.p.m., and cuts to a depth of $\frac{1}{4}$/$\frac{1}{2}$ in. leaving a trail of sawdust-like peat over the field. This contains about 95 per cent water and immediately begins to drain. The loose peat is then harrowed by tractor, fitted with a bulldozer-type scraper which sweeps the loose peat into a ridge in the middle of each field.

Mechanical Process

The ridge is then harvested by a tractor fitted with two worms which lift the peat through a chamber on to an elevated boom-conveyor which deposits the ridge from field number one to the ridge in field number two, and so on until five successive fields have been harvested and the loose peat is piled in a high ridge in the fifth field. When the peat has been dried to approximately 50 per cent moisture content it is loaded on to a light railway.

The drying and briquetting plant uses a series of hot water and exhaust steam chambers to dry and compress the peat, reduced to 10 per cent moisture content, into a briquette. Tailings which are unsuitable for briquetting are used as boiler fuel. The calorific value of the briquettes is 8000 B.T.U.

Peat has also been used successfully in the generation of electricity and gas and has been used as the raw materials for wall boarding and as a source of wax and various chemicals.

Given a basic fuel industry using peat as the raw material and operating economically, as it could, on a large mechanised scale, a very considerable variety of subsidiary by-product industries could be developed.

According to Mr. Tomters, Continental practice has made considerable progress in this direction and much useful material is derived from peat. The methods described, although not yet in practice in this country, where they were originally experimentally developed, are likely to be adopted when a large-scale development of peat processing is approved.

Wax from Peat

New Edinburgh Company formed

THE development of a branch of the chemical industry based on peat and involving ultimately production of ester wax is visualised by the registration of Highlands and Islands Developments, Ltd., in Edinburgh. The new company will take over from Dr. Purves and develop the undertaking which he has been operating for the past 18 months in Argyllshire and Stirlingshire. The intention is to open and work lime kilns, using peat as a fuel; to work peat as a fuel and as a source of chemicals including ester wax; to establish local Portland cement works and similar businesses. Headquarters are Graham, Smart and Annan, 22 Charlotte Square, Edinburgh, and at North Connel, Argyll.

The basis of the plan is the stripping of peat on a major mechanised scale and its use and conversion. It is argued that peat offers a basis on which to build a new Highland economy, since costs of materials brought into the area are so high as to make it essential that all local materials be used. Ample quantities of raw materials abound locally for cement brick production and this will be a major part of the proposals. The use of peat in the lime-burning industry will also encourage the lime-producing industry locally and therefore be of value to Scottish agriculture.

OFFICIAL NOTICES

The Postmaster-General announces that there are no longer any language restrictions in the Anglo-Czechoslovakian telephone service.

The Ministry of Supply has announced that as from February 1 the price of home-produced deadburnt magnesite is reduced to £14 10s. per ton delivered.

The Treasury have made The Safeguarding of Industries (Exemption) (No. 1) Order, 1947 (S. R. & O. 1947, No. 182), exempting Vioform (iodo-chloroxyquinoline) from Key Industry Duty until June 30, 1947.

The Ministry of Supply has announced that the revised licensing procedure for the acquisition of tin metal (*see* THE CHEMICAL AGE, February 1, p. 197) has now been modified. Arrangements have been made by which tin consumers who were unable to obtain cover for tin metal, owing to their holdings being in excess of four months' consumption, may now cover themselves each month to the extent of 90 per cent of their monthly rate of consumption in the basis period (September and October, 1946). Inquiries should be made to the Directorate of Non-Ferrous Metals, 20 Albert Street, Rugby (telephone Rugby 2132).

The Board of Trade has announced that, as from February 14, no licence is required for the winning of china clay. This is given effect by the Production of China Clay (Removal of Restrictions) Order, 1947 (S. R. & O. 1947, No. 239), which revokes the Production of China Clay (Restriction) Order, 1942. The provisions of the China Clay (Charges) Order, 1943, as amended by the China Clay (Charges) (Amendment) Order, 1946, are also revoked by an Order entitled the China Clay (Charges) (Revocation) Order, 1947, made by the Treasury, which came into force on February 14. It is pointed out, however, that producers are not relieved of their liability to pay charges incurred before that date.

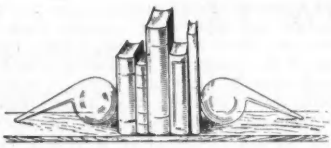
The Board of Trade has announced that Token Import arrangements are now extended to Finland, Italy and Norway. Token imports of goods included in the scheme will accordingly be admitted from individual manufacturers or their export agents, in any of the three countries, at the yearly rate of 20 per cent by value of each firm's pre-war trade with United Kingdom in the goods in question. Applications for licences should be sent to the Import Licensing Department, Board of Trade, 189 Regent Street, London, W.1, and will be considered only when accompanied by a token shipment voucher identifying the goods which are subject of the application with those of a specified manufacturer in the respective country.

New selling arrangements have been put into force by the Ministry of Supply in regard to non-ferrous metals to meet the changed conditions caused by the increased world prices for copper, lead and zinc. The old system under which intending purchasers were granted licences by the Ministry with an option, which need not be exercised, to purchase at the price then ruling, unaffected by subsequent price increases, has now been withdrawn. The option has now been withdrawn and licences, with the exception of those granted before December 31, 1946, must now relate to firm orders for metal at current prices.

Reports by German persons of assets owned by them abroad have revealed that many persons in the United Kingdom have failed to comply with the Trading with the Enemy (Custodian) Order 1939 (S. R. & O. 1939, No. 1198), requiring them to report to the British Custodians of Enemy Property enemy-owned property held by them or moneys owing by them to enemies. Such failure is a punishable offence and continued failure to report will be seriously viewed, it is officially stated. Persons residing or in business in England or Wales who have not yet complied should communicate forthwith with the Custodian at 24 Kingsway, London, W.C.2 those in Scotland or Northern Ireland, with the Custodians at 28 New Register House, Edinburgh, 2, and the Royal Courts of Justice (Ulster), Room 26, Belfast, respectively.

Sweden, like Switzerland, has not yet joined the International Convention of July 27, 1946, on German patents, although both countries have, together with other non-member nations, been invited by the original signatories to adhere not later than the beginning of this year. While Switzerland has already replied to this invitation in the negative, the subject is still being studied by the responsible Swedish authorities. The number of valid German patents registered in Sweden amounted at the end of 1946 to 2963, as compared with 4844 at the end of 1940. Pending the accepted publication of the findings of the official inquiry into this patent question, no sale or other transfer of German patents is to be carried out.

Of the other Scandinavian countries, Norway and Denmark have joined the International Convention of July last.



A CHEMIST'S BOOKSHELF

The Dyeing of Textile Fibres, 2nd edition R. S. Horsfall and L. G. Lawrie. Published by Chapman and Hall Ltd. pp. 438. price 25s.

The authors are to be congratulated on the second edition of this work. Although the new edition follows the same lines as the original one in its treatment of the subject, it has been thoroughly revised and a number of chapters have been completely rewritten and expanded so that the effect is almost that of a new book rather than a second edition. A full account is given of the results of modern research on the constitution and properties of various textile fibres, and also of the modern conception of the theory and mechanics of the dyeing process. The work is essentially one for the student and technician in practical dyeing and the authors have bridged the gap between pure research and practical application in a very capable manner.

It is unlikely that any text book will ever be completely up to date, or will not be criticised because of certain omissions which a reviewer or reader feels ought to have been included and the present volume is no exception in this respect. More stress might have been laid on the care necessary when dyeing materials in machines of the circulating type, and the control of the dyeing process by a suitable choice of dyestuffs with a slow rate of dyeing or those which will level easily by a prolonged treatment, or aternatively by restraining the speed of dyeing by the use of suitable auxiliary agents.

The section on Bast fibres has been rather sketchily treated and might well have been expanded. Little is said about the preparation for dyeing of yarns or fabrics made from these fibres and this is an important phase in the successful dyeing and finishing of such materials. No mention is made, for example, of the newer developments in the preparation of jute fabrics by a combination of solvent extraction followed by peroxide bleaching. Admittedly it is only used to a limited extent but for certain purposes it is undoubtedly the best preparation and it is a new and modern development. The same treatment can be applied to certain linen and linen-rayon mixture fabrics and reference to the process in this section would have added to the value of the chapter.

On page 158 in the chapter dealing with the dyeing of rayon materials, a statement is made that crepes and similar materials must be winch dyed as by their very nature they would not run satisfactorily on the jigger. This is much too sweeping a statement to make as many types of crepe material can be and are dyed on jiggers. The machines used are of a special type and have been developed specifically to deal with materials of this kind which dye unsatisfactorily on the winch machine. No reference is made to these machines nor to the types of material for which they have been designed and the fact that tensions have been eliminated to such an extent that crepe materials with quite a high percentage of warp shrinkage can be handled successfully on them has been completely overlooked. On page 170 very short mention is made of the chemical delustring processes for acetate rayon. These are still quite widely used. Only phenol is mentioned as a "matting" agent although there are many other agents which will act in a similar manner and with a greater margin of safety. No mention is made of the loss in strength which always occurs when delustring is carried out by such means, nor is any warning given of the care that must be taken to see that any reagent used is completely dissolved or perfectly dispersed throughout the bath, if localised damage to the yarn or fabric is to be avoided. The foregoing criticism is also applicable to the section on page 338 dealing with acetate unions with silk or wool.

The most notable omission in the wool section is the complete absence of any reference to the work of Speakman, Townend and others on the effect of chlorination, and other chemical treatments on the dyeing properties of wool, and of the selection and development of special dyestuffs to give varying effects on treated and untreated wools. This work is full of possibilities and a fair amount has been published in various journals during the past two or three years. Some reference to it ought to have been included in a modern work on the dyeing of wool.

In the chapter dealing with fastness tests more exactness ought to have been shown in the test described for fastness to hot pressing. A full description is given for this under cotton and a temperature of 190 to 200° C. is mentioned, but when applying to wool and rayon the text merely states that the test is carried out as described for

cotton. It is customary to use a considerably lower temperature when testing this property on wool and acetate rayon, but no mention is made of this. Also under this test note should be made of sublimation, and the test carried out in contact with a piece of white material, observation being made of any marking off effect as certain dyestuffs tend to sublime and mark off with dry heat treatment at ironing temperatures.

The book is well produced and printed, with very few typographical errors. On the third but last line of page 221 the word " on " appears for " no " and on pages 383, 385, 388, 394, 397, 403 and 405 reference is made to Igepal A and T, this should be " Igepon," the Igepals being a different type of agent and correctly mentioned on page 386. The references in the index should likewise be corrected. Finally, why do authors of text books on dyeing not make quite clear at the commencement the relationship between their recipes and the materials they are treating and using? Most of the quantities given in this book are stated as percentages, and while it is almost automatically assumed that these fractions are percentages of the weight of material being treated, unless this is clearly stated it can be very confusing to the beginner or newcomer to the trade and, secondly, methods of expression and interpretation of such receipts do vary from one section of the trade to another.

In spite of the criticisms made which are intended to be constructive, the volume is one which can be recommended to all students and practitioners of dyeing.

R. J. HANNAY.

U.S. Mineral Resources

Benefits of War-Time Developments

THE U.S.A. Bureau of Mines discloses in its annual report that, in spite of the devastating inroads war made upon the nation's reserves of domestic minerals and raw materials, the United States still is in a " comfortable " position in respect of several important commodities and has favourable prospects for improving war-developed processes for breaking down low-grade ores.

From a position of comparative self-sufficiency in many metals and minerals, the war's end found the country almost wholly dependent upon foreign resources for many minerals, but with over-abundance in bituminous coal and lignite, magnesium, low-grade iron ores, salt, potash and certain other products.

Due to the natural recession of exploratory work which the war had stimulated, the Bureau last year examined only 200 mineral deposits in 30 States and Alaska, compared with 850 the previous year, and conducted actual drilling, trenching, or test-pitting on only 75 deposits, just half the number of 1945. Several successful peace-time mining operations were, however, established for mercury, copper, lead and zinc, asbestos and feldspar, and new reserves were marked out in iron ores, fluorspar, mica, corundum, beryl, spodumene, bauxite, and ores of tungsten, nickel and manganese. The largest potential reserve of magnetite was located in Iron County, Utah, where a deposit, estimated at approximately 375 million tons, is expected to be the principal source for iron ore for the well-established Pacific Coast steel industries.

Outstanding in the Bureau's metallurgical research last year was the production of four new highly pure metals: electrolytic chromium, electrolytic cobalt, ductile titanium, and ductile zirconium. These, added to the Bureau's pre-war development of electrolytic manganese and sponge iron, are expected to solve many problems in research requiring metals for high temperature service.

In anticipation of future demands from the war-born jet propulsion industry, the Bureau extended its research on aviation fuels and determined that at least 30 of the country's crude oils are suitable for the production of jet propulsion fuels, thus assuring a steady supply when the need arises. Demand for petroleum and petroleum products in the first peacetime year—unlike production—hovered near the war-time peak because of the lifting of civilian restrictions and the efforts of the industry to replace war-depleted stocks. To offset the rapid depletion of the known petroleum reserves, the Bureau investigated new methods of oil production, increased its efforts to utilise the less popular crude oils more generally, and completed the overall pattern for its synthetic liquid fuel programme.

During the war, the Bureau acquired a new gas-synthesis laboratory at Morgantown, W. Va., and a Government-owned ammonia plant at Lousiana, Wyn. Construction work was advanced on previously-authorised units at Bruceton, Pa., at Laramie, Wy., and at Rifle, Colo., for manufacturing synthetic liquid fuel from coal, lignite, oil shale, and other materials.

Because of continuous shortages of coal, despite new wartime advancement in fuel production, the Bureau's solid fuels technicians continued intensive investigation of new domestic sources of coking coal, and provided a technical advisory service.

NEXT WEEK'S EVENTS

MONDAY, MARCH 10

Society of Chemical Industry (Yorkshire Section). Leeds University, 6.30 p.m., annual general meeting 7 p.m. Dr. J. H. Schulman, Sc.D.: "Structure of Solubilised Oils and Emulsions."

Institute of Welding (North London Branch). Regent Street Polytechnic, 7.30 p.m. Mr. R. E. Dore: "Flame Cuttting Developments, Past, Present and Future."

TUESDAY, MARCH 11

Textile Institute (Macclesfield Section). Macclesfield Memorial Hall, Macclesfield, 8 p.m. A. N. Sidebottom, A.M.C.T.: "Costing in Relation to Management."

Textile Institute (Midlands Section). Technical College, Loughborough, 6.45 p.m. Dr. E. R. Trotman; "The Finishing of Knitted Garments and Fabrics."

Society of Chemical Industry (Plastics Group), jointly with Institute of Plastics Industry (London Section). Royal Society of Tropical Medicine, Manson House, 26 Portland Place, W.1, 2.30 p.m. Dr. E. G. Williams: "Contact Pressure Laminates."

WEDNESDAY, MARCH 12

The Society of Dyers and Colourists. (Northern Ireland Section). Queen's Hotel, Belfast, 7.30 p.m. J. G. Grundy: "The Application and Fastness Properties of Dyes on Nylon."

Society of Chemical Industry (Food group.) Burlington House, Piccadilly, W.1., 6.30 p.m. Mr. B. M. Brown: "Biological Stability of Beer" and Prof. B. T. P. Parker and Dr. V. L. S. Charley: "Biological Stability of Cider, Fruit Juices and Soft Drinks."

British Association of Chemists (Liverpool Section). Nicholson Lecture Theatre, New Organic Chemistry Dept. The University, Dansie Street, Liverpool, 7 p.m. A joint meeting of the local sections of the Royal Institute of Chemistry Chemical Society, Society of Chemical Industry and British Association of Chemists.

THURSDAY, MARCH 13

Pharmaceutical Society of Great Britain. 17, Bloomsbury Square, W.C.1., 7 p.m. William C. Peck, M.Sc., F.R.I.C., M.I.Chem.E., A.M.I.Mech.E.: "Recent Developments in Pharmaceutical Apparatus."

The Chemical Society (Edinburgh and East of Scotland Sections). North British Station Hotel, Edinburgh, 7.30 p.m. Professor A. C. Chibnall, F.R.S.: "The Composition and Structure of Proteins."

Textile Institute (Yorkshire Section). Technical College, Keighley, 7 p.m. A. Poncelet: "Textile Machinery."

FRIDAY, MARCH 14

Society of Chemical Industry (Chemical Engineering Group). Burlington House, Piccadilly, W.1., 5.30 p.m. Mr. A. Milnes: "Steam Saving in the Chemical Engineering Industry."

Textile Institute (Lancs. Section). Textile Institute, Manchester, 1 p.m. L. J. Clarke: "Recent Trends in Ribbon Manufacture."

Indian Chemical Tariffs

Following claims by branches of the Indian chemical industry, the Government of India has prescribed protective duties on certain imports from the United Kingdom as follows:

Sodium thiosulphate.—Existing standard rate of 36 per cent *ad valorem* and preferential rate of 24 per cent to be replaced by specific protective duties of Rs. 7.8.0 per cwt. and Rs.5 per cwt. respectively.

Sodium sulphite and sodium bisulphite: Existing standard rate of 36 per cent *ad valorem* and preferential rate of 24 per cent to be replaced by specific protective duties of Rs.12 per cwt. and Rs.8 per cwt. respectively.

Sodium bichromates, potassium bichromates and all chrome compounds: Existing revenue duty of 30 per cent to be replaced by protective *ad valorem* duty of 30 per cent.

Phosphoric acid: Existing revenue duty of 30 per cent *ad valorem* to be replaced by specific protective duty of Rs.23 per cwt.

Sodium phosphates: Existing standard rate of 36 per cent *ad valorem* and preferential rate of 24 per cent to be replaced by specific protective duties of Rs.11 per cwt. and Rs.7.6.0 per cwt. respectively.

Calcium chloride: Existing standard rate of 36 per cent *ad valorem* and preferential rate of 24 per cent to be replaced by specific protective duties of Rs.4.14.0 per cwt. and Rs.3.4.0 per cwt. respectively.

The attention of all readers is drawn to the announcement on page 282 about suspended issues of THE CHEMICAL AGE and subscription orders.

Personal

MR. A. H. V. MUIRHEAD has recently joined the board of Catalin, Ltd.

MR. SAMUEL COURTAULD, former chairman of Courtaulds, Ltd., has been elected president of the British Rayon Research Association.

MR. A. E. J. SIMON THOMAS, MR. F. J. TEMPLE and MR. ROGER H. HEYWORTH have been appointed to the board of Lever Brothers and Unilever N.V.

MR. C. K. F. HAGUE, managing director of Babcock & Wilcox, Ltd., has been appointed to be a member of the Engineering Advisory Council, set up recently by the Government.

DR. GLENN S. WATSON has been appointed chief chemist with the Calco Chemical Division, American Cyanamid Company. He joined the Calco organisation in 1936 and for some time was connected with the company's research laboratories.

Dr. Glenn S. Watson

MR. C. B. LEATHER, who is the newly-elected president of the Seed, Oil Cake and General Produce Association, is joint managing director of Simmonds, Hunt & Montgomery, Ltd., cattle food manufacturers and distributors.

MR. W. E. HAMER has been promoted to research superintendent in charge of process investigations for Monsanto Chemicals, Ltd., and DR. J. W. BARRETT to research superintendent in charge of exploratory and application research.

DR. MARKUS GEWING, chief chemist of Belfast Silk & Rayon, Ltd., who has done much research, including work on urea-formaldehyde resins, has been elected a Fellow of the Textile Institute, along with MR. T. ROWLAND WYLDE, superintendent of the woven fabrics department, British Celanese, Ltd., and MR. DONALD N. ASPDEN, manager of Bangalore Woollen, Cotton & Silk Mills Co., Ltd., in India. New Associates are MR. C. H. DOUGLAS SPENCER, assistant manager, W. H. Spencer & Sons, Ltd., and MR. PETER THORNTON and MR. JOHN R. CHAMPION, B.Com., both of the technical staff, British Nylon Spinners, Ltd.

LT.-GEN. SIR WILFRED LINDSELL, G.B.E., K.C.B., M.C., LL.D., has joined the board of Manchester Oil Refinery, Ltd. Sir Wilfred is also a director of the associated companies, Petrocarbon, Ltd., and Petrochemicals, Ltd.

DR. J. L. and MRS. HAUGHTON (neé Dr. M. L. V. Gayler) have been jointly awarded the Platinum Medal of the Institute of Metals for 1947 in recognition of their outstanding services to the science of metallurgy.

DR. D. W. F. HARDIE, research chemist with Imperial Chemical Industries, Ltd., at Widnes, is the author of a novel "The Iron Egg," shortly to be published by Nicholson and Watson. Dr. Hardie is the author of several other works, including a scientific romance "Sixth Column."

Obituary

MR. WALTER BLUMENTHALL, export manager of Manchester Oil Refinery, Ltd., has died, aged 60.

MR. H. E. CHASTENEY, H.M. Inspector of Factories, Ministry of Labour and National Service, died on February 18. Mr. Chasteney, who lived at Red House, Woodlands Way, Purley, Surrey, and was 58, died after a street accident. He had succeeded Sir Wilfred Garrett as Chief Inspector of Factories in January last year.

DR. BEVAN LEAN, whose death at the age of 81 is reported from Winscombe, Somerset, was a former tutor at Dalton Hall, Manchester, during which time he was Dalton Chemical Scholar (1891) and received the Berkeley Fellowship (1893), and later lecturer and demonstrator in chemistry at Owen's College. He was finally headmaster for 28 years of Sidcot School, Somerset.

MR. A. H. MIDDLETON, whose death took place recently at the age of 67, was a prominent figure in the coal carbonisation and refractory industry. He was senior past president of the Coke Oven Managers' Association and chairman of the Northern Coke Research Committee. Until his retirement two years ago, Mr. Middleton was general manager of the Consett Iron Company's coke and brickworks plant.

Home News Items

Record Coal Output.—Coal production, deep-mined and opencast, totalled 4,000,000 tons in the week ending February 24—the highest figure recorded this year, despite adverse weather. The comparaole figure for last year was 3,700,300 tons.

Allocation of Cocoa Beans.—The International Emergency Food Council has announced a recommended allocation of cocoa beans among importing nations for the year ending September 30, 1947. The total exportable surplus, including cocoa butter in terms of beans, for 1946-47 is estimated at 612,320 long tons—slightly less than the previous year's figure of 629,485 long tons. The United Kingdom's allocation is 1850 long tons, the highest after the United States' 4000 long tons.

Selling Price of Copper.—The Minister of Supply has made the Control of Non-Ferrous Metals (No.27) (Copper, Lead and Zinc) Order 1947, which amends the Control of Non-Ferrous Metals (No.26) (Copper, Lead and Zinc) Order 1946 and increases the maximum price of copper by £10 per ton. The price of high conductivity electrolytic copper is therefore increased from £117 to £127 per ton. Prices for other forms of copper are correspondingly adjusted. Inquiries concerning the above should be addressed to the Directorate of Non-Ferrous Metals, 20, Albert Street, Rugby.

Imports from Germany.—The trading with the enemy regulations have been lifted as from March 4 and private import trade from the Anglo-American zones of Germany may now be resumed on a limited scale. Only essential goods, including chemicals, will be imported into Britain. Potash and metals will continue to be dealt with on a government-to-government basis. Payment for goods imported from the two zones will be in sterling. Inquiries should be addressed to the Sundry Materials Branch, Board of Trade, 10 Old Jewry, London, E.C.2. The relaxations are extended also to include the Russian zone of Germany.

I.C.I. 5-day Week.—A five-day week will soon be in operation for most I.C.I. (Alkali) Division day workers employed at Winnington, Lostock, and Wallerscote. The hours worked weekly by both day and night shift will be reduced. An official statement reads: "On Monday, March 10, the Alkali Division of I.C.I. will reduce the ordinary weekly hours of work from 47 to 44 for day and two-shift workers, and from 48 to an average of 42 for three-shift workers at the Mid-Cheshire works. The great majority of day employees will not be required to work on Saturday mornings. At the British Ethyl Corporation works at Plumley the reduction will begin on March 24. Great efforts will be made by all employees to ensure that the weekly output is maintained and if possible increased. The weekly earnings of all workers will remain unchanged." It is estimated that about 8000 employees at the Mid-Cheshire plant of I.C.I. will come under the new scheme.

Yeast Workers' Strike.—The strike of 300 yeast workers at the Distillers' Company factory, Liverpool, for a 44-hour working week, 14 days holiday with pay, and extra pay for shift workers, ended on February 26 when the employees decided to return to enable negotiations to be re-opened. Ald. Luke Hogan, divisional officer of the Union of Shop Distributive and Allied Workers, who advised the men to return, said the firm was prepared to listen to the men's claim but was bound by agreements with the Heavy Chemicals Joint Industrial Council, which was not prepared to make any move until the men went back

Staggered Working Hours.—Referring to the proposal to stagger industrial working hours, an official of the Dunlop factory at Speke thought it was not just a question of splitting the labour force in two and putting one half on night work and the other half on day shift. "That is not what the central electricity board want," he said. "They want to stagger the power load over a 24 hour period. We are trying to work out a plan to do this now. We have some heavy machines which use a lot of electricity and some machines which use less. We do not want to bring in a lot of women at night-time. Probably we will use our heavy machines at night, so that the majority of our labour force is working in the day-time."

Fatal Laboratory Fire.—A fire in the laboratory of British Glues and Chemicals, Ltd., Newark, recently resulted in the death of a chemist, Mr. Richard Henry Riddell, while Miss Edna Knight, a laboratory assistant, was taken in critical condition to Newark Hospital. The office manager saw the young woman rushing from the laboratory in flames, then saw flames issuing from the building, and gave the alarm, but heat was so intense that the fire brigade was unable to enter for over half an hour. When firemen, equipped with breathing apparatus, went into the burnt-out laboratory they found the body of the chemist. What happened within the laboratory can be told only by the injured assistant when she is sufficiently recovered to give evidence at the adjourned inquest.

Overseas News Items

Penicillin price.—The U.S. price for amorphous penicillin has recently been reduced from 50 to 42 cents per 100,000 unit vial.

Potash Control.—Control over the allocation of potash has been terminated in the United States. France is to ship 16,000 short tons of potash to the U.S.A. in the three months ending May.

Cinchona Bark Control.—The President of the United States has asked Congress to extend Government control over the allocation of cinchona bark and alkaloids beyond the end of March when the Second War Powers Act expires.

German Glass Exports.—It is reported from Prague that representatives of the Czechoslovak, Belgian and French glass industry are meeting to plan action against what is understood to be American-sponsored expansion of German glass exports.

Insulin from Fish.—To date, 500,000 units of insulin have been obtained from saltwater fish at a new German factory at Wesermuende in the British zone, instead of importing it from the United States and Denmark, reports Leipzig radio.

Rhodesian Lead and Zinc.—Output of the Rhodesia Broken Hill plant in January was 1829 tons of zinc and 1255 tons of lead, compared with 1840 tons of zinc and 1202 tons of lead in December. No fused vanadiaum was produced.

Platinum Discovery.—Analysis of rock specimens discovered in a Government survey of part of the Njombe district of Tanganyika has revealed platinum present "in a concentration which, though uneconomic, approaches that of ores commercially workable with platinum at its present price."

Invoices on Shipment to Peru.—Consular invoices covering shipments to Peru must be legalised by the Peruvian Consul before the departure of the shipment. Because this formality was omitted fines equivalent to 25 per cent of the value of the goods have recently been imposed on Peruvian importers from Canada.

Belgian Copper Up.—In Belgium, the freeing of trade in non-ferrous metals has led to an increase in prices (per metric tons, ex works): electrolytic copper costs 20,000 francs against 19,750 at the beginning of January, lead has risen from 10,950 to 12,220 francs and zinc from 8300 to 12,000 francs. The price for tins remained unchanged at 68,250 francs.

Belgian Steel for Britain.—The British Government's acceptance of the Belgian Government's offer of 92,000 tons of steel is to be followed next week by discussions in Brussels between steel experts of the two countries as to technical details of delivery.

Refined Lead Production.—Production of refined lead in the United States, from primary and secondary sources, was in 1946 414,381 tons—almost 110,000 tons below the 1945 figure because of the strikes which crippled operations in the industry.

Turkish mission for U.S.—A Turkish purchasing mission is to leave soon for the United States to acquire chemical plant, including machinery for the production of 6000 tons of nitric acid per annum, of 2000 tons of crystallised ammonium nitrate and of 28,000 tons of nitro-lime fertiliser.

Uruguayan Linseed.—Cancellation of contracts for the export of linseed oil owing to the recent steep increase in world prices are considered likely in Uruguay. The export surplus is estimated at about 90,000 to 100,000 tons, out of a total production of from 110,000 to 120,000 tons.

Malayan Rubber Exports.—The United Kingdom, importing 19,640 tons, followed by the United States, 17,751 tons, again headed the list of buyers of Malayan rubber during January. Malaya's rubber exports for that month totalled 67,504 long tons—1659 tons less than in December.

U.S.A. Steel Expansion.—Steel companies in the United States plan to spend £112,000,000 for new equipment and facilities in 1947; 54 per cent more expenditure than last year. A large proportion of the current year's outlay will be for expansion of the industry's capacity for sheet and strip steel.

U.S. Insecticide Shortages.—The U.S. insecticide supply position is reported to be uncertain; DDT output is handicapped by a shortage of chlorine, while lead arsenate output is hampered by shortages of lead and arsenic. Pyrethrum supplies are satisfactory, but rotenone supplies depend on further shipments from Peru.

U.S. Alkalies Exports.—Almost all export orders for U.S. alkalies are being indefinitely postponed on account of the present scarcity. South American customers will receive priorities for the limited quantities available, however. It is reported that a large number of industrial plants in these countries are threatened with a standstill owing to the scarcity of soda ash and caustic soda.

Commercial Intelligence

The following are taken from printed reports, but we cannot be responsible for errors that may occur.

Mortgages and Charges

(Note.—The Companies Consolidation Act of 1908 provides that every Mortgage or Charge, as described therein, shall be registered within 21 days after its creation, otherwise it shall be void against the liquidator and any creditor. The Act also provides that every company shall, in making its Annual Summary, specify the total amount of debt due from the company in respect of all Mortgages or Charges. The following Mortgages and Charges have been so registered. In each case the total debt, as specified in the last available Annual Summary, is also given—marked with an *—followed by the date of the Summary, but such total may have been reduced.)

GRAPPENHALL CHEMICALS, LTD., Warrington. (M., 8/3/47.) January 17, £900 debenture, to F. Pitts, Lymm; general charge. *Nil. November 21, 1945.

H. & T. PROCTOR, LTD., Bristol, chemical manure manufacturers. (M., 8/3/47.) January 16, mortgage and charge to National Provincial Bank, Ltd., securing all moneys due or to become due to the Bank; general charge. *£5000. October 22, 1946.

NUTILUS PRODUCTS, LTD., Kingston-on-Thames, chemists, etc. (M., 8/3/47). January 20, £4000 charge, to E. P. Fridaye, London; charged on 2 and 4 Victoria Road, and 6 Albert Road, Norbiton (formerly known as The Victoria Tavern with two cottages adjoining stables at rear thereof). *£1000. July 19, 1945.

Receiverships

Roberts, Orme & Co., Ltd., chemical manufacturers, etc., Barton Street, Bristol, 2. (R., 8/1/47). Chas. H. Maggs, C.A., 16 Clare Street, Bristol, was appointed receiver on February 13, 1947, under powers contained in debenture dated September 21, 1945.

Grappenhall Chemicals, Ltd., 82 Sankey Street, Warrington. (R., 8/1/47.) Eric C. Smith, C.A., 44 Brazennose Street, Manchester, was appointed receiver and manager on January 30, 1947, under powers contained in debenture dated December 31, 1946.

New chemical notation.—Dr. G. M. Dyson, M.A., Ph.D., F.R.I.C., originator of the proposed new notation for organic chemistry, is journeying from Loughborough to London on March 19, when at 6.15 p.m. he will deliver a lecture at the Sir John Cass Technical Institute, Jewry Street, Aldgate, E.C.3, on "The Dyson System of Indexing Organic Compounds." An article on this subject was given in THE CHEMICAL AGE, February 15, 1947, pp. 251-254.

Company News

The name of Ciba, Ltd., has been changed to **Ciba Laboratories, Ltd.** Management and policy are unchanged.

An increase in net profit for the year from £19,278 to £23,572 was made by **British Tin Investment Corporation, Ltd.** Total dividend for the year is 2 per cent (same).

Viscose Development Co., Ltd., reports a net profit of £34,292 (£11,480) and has declared a final dividend of 7 per cent (same), making 10 per cent (same).

The name of **Peter Markham (Chemicals), Ltd.,** 82 Victoria Street, London, S.W.1, has been changed to **Peter Markham, Ltd.,** as from November 13, 1946.

A profit for the year to November 30 of £29,775 (£24,744) was reported by **Fairy Dyes, Ltd.** An ordinary dividend of 7½ per cent (6 per cent) was recommended.

Benzol and By-Products Co., Ltd., announces a dividend on 6 per cent Participating Preferred for the half-year to March 31, 1939.

Profit of £193,794 (£96,726) is announced by **Blundell, Spence and Co., Ltd.** Ordinary dividend is 6 per cent (same), plus bonus of 4 per cent (2).

Net trading profit of **Anchor Chemical Co., Ltd.,** for the year ended November 30, 1946, was £87,985 (£53,297). Final dividend has been declared of 20 per cent, making 30 per cent (same).

The nominal capital of **S. & D. (Estd. 1783) Chemical Manufacturing Co., Ltd.,** Driffield Place, Leeds, 1, has been increased beyond the registered capital of £100 by £3900 in £1 shares.

The nominal capital of **Silverwood Chemicals, Ltd.,** Mandrell Road, London, S.W.2, has been increased beyond the registered capital of £1000 by £4000 in £1 ordinary shares.

The nominal capital of **South Eastern Chemicals, Ltd.,** 24-5 Main Street, Assington, Essex, has been increased beyond the registered capital of £100 by £400 in £1 ordinary shares.

The nominal capital of **Chemical and Petroleum Investments, Ltd.,** 14 Waterloo Place, London, S.W.1, has been increased beyond the registered capital of £150,000 by £50,000 in £1 shares.

Trading profit for 1946, announced by **London Aluminium Co., Ltd.,** totalled £147,367. After deducting £3121, being profits of Williams (Birmingham) from January 1 to liquidation, £24,205 was left. Final dividend of 10 per cent, making 20 per cent, has been declared. The company was made public in June last.

Mine production by **Broken Hill South, Ltd.**, for the year ended June 30, 1946, was valued at £1,718,975 (£1,500,335). Net profit was £211,970 (£263,981), plus net profit from investments section of £109,463 (£80,507).

The nominal capital of **Brobat Manufacturing Co., Ltd.**, chemical manufacturers, etc., 131 Wandsworth Road, London, S.W.8, has been increased beyond the registered capital of £2000 by £13,000 in 2s. ordinary shares.

The nominal capital of **Cutrilin, Ltd.**, chemical manufacturers, etc., Rylstone, Holders Hill Crescent, London, N.W.4, has been increased beyond the registered capital of £1000 by £4000 in £1 "B" ordinary shares.

At the annual meeting of **English China Clays, Ltd.**, it was stated that increased dividends paid by English Clays Lovering Pochin and Co., Ltd., had brought net revenue up to £48,124 (increase of £14,327), enabling an increased Ordinary dividend to be recommended of 4 per cent (2½ per cent).

In a preliminary statement in New York for 1946, **E. I. du Pont de Nemours and Co.** reports that net earnings were equal to 9.44 dollars per share (6.29 dollars), which is the largest per share earning in its history. Dividend for the first quarter of this year has been raised to 2 dollars per share (1.25 dollars).

Gas, Light and Coke Co., announced a net profit on the past year of £995,628 (£1,187,859). Ordinary dividend was 5 per cent (same). Gas sales in 1946 amounted to £14,257,571 (£12,252,458); sale of by-products, £5,079,919 (£4,481,479). Cost of gas manufacture was £12,770,198 (£11,167,753) and of distribution £3,637,632 (£2,622,625). Expenditure on maintenance and renewal of buildings and plant was £500,000 (nil).

Erection of a pilot plant and substantial extensions of existing plant and of the research department were referred to at the annual meeting of **Borax Consolidated, Ltd.** The chairman, Mr. D. Abel Smith, M.C., commented that borax now seemed destined to become a regular ingredient of fertiliser mixes, instead of being regarded as purely a specific cure for the well-defined boron-deficiency diseases.

The board of directors of **Ciba**, of Basle, one of Switzerland's leading chemical groups, decided towards the end of January to call upon its shareholders to pay the sum of 800 Sw. frs. per registered share, which will thus become fully-paid. This measure is stated to be due, in the first instance, to the group's need for larger capital as a result of a more intensive business activity. Part of the new money will undoubtedly be used to expand productive capacity which had, of necessity, to be interrupted both at home and abroad during the war years.

New Companies Registered

North Kent Chemical Co., Ltd. (430,087).—Private company. Capital £250 in £1 shares. Manufacturers of chemicals, chemical products, etc. Directors: R. W. Barton and D. G. Barton. Registered office: 100 Wellington Street, London, S.E.18.

Chemical and Allied Stocks and Shares

STOCK markets have displayed a strong recovery from the setback which resulted from the fuel crisis, buyers predominating in most sections, with spectacular gains in Argentine Rails. British Funds, as an exception, were lower on balance. Industrial shares came into renewed demand and, though the emphasis was on shares of companies with important overseas interests, the rally was broadly based. Rising metal and commodity prices in the U.S.A. have had reflection here in higher London prices for silver and copper, and the upward trend in share values is regarded by many observers as part of the inflationary trend in world economy.

Shares of chemical and kindred companies moved closely with the day-to-day tendency of markets, a sharp reaction on the fuel crisis being followed by a good rally following the industrial "switch-on." Imperial Chemical rallied to 44s. 9d., accompanied by market talk of a possible increase in the dividend, which for some years has been limited to 8 per cent. Dunlop Rubber were 71s. 9d.; British Oxygen 97s. 6d.; and British Match 54s. 6d.; while, reflecting satisfaction with the financial results and the raising of the distribution from 7½ per cent to 10 per cent, Borax Consolidated were good at 56s. 3d. British Aluminium also rallied to 44s. 3d., while the rising trend in base metal prices helped Amalgamated Metal shares (19s. 9d.), and Imperial Smelting 20s. 6d. Elsewhere, the higher dividend raised British Ropes 2s. 6d. ordinary to 12s. 3d., while there was also a sharp advance to 5s. 7½d. in Low Temperature Carbonisation 2s. shares accompanied by talk of pending developments.

Iron and steels participated in the rally. Babcock & Wilcox were prominent at 74s. 6d., with Ruston & Hornsby 67s. 3d., on the expected big demand for oil engines and similar plant. Guest Keen recovered to 48s. 3d.; Thomas & Baldwins were 12s. 9d.; United Steel 26s. 10½d.; Stewarts & Lloyds 58s. 1½d.; Dorman Long 29s.; and Colvilles 25s. 7½d. Colliery shares continued prominent on break-up value estimates, with Bolsover 76s. 6d.; Horden

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34s. 9d.; Staveley 60s. 6d.; while Powell Duffryn moved up to 28s. 6d. following news of the acquisition by the company of further non-colliery interests. Higher dividend hopes kept General Refractories firm at 23s. 6d., and Metal Box shares recovered to £5¾. International Combustion shares were good on the financial results and share "splitting" proposals, the price rising to £11¼. Elsewhere, B. Laporte were 97s. 6d.; Burt Boulton marked 27s.; and W. J. Bush 91s. British Drug Houses changed hands up to close on 61s., and Greeff-Chemicals Holdings 5s. ordinary at 12s. 6d. Morgan Crucible at 56s. regained part of an earlier decline, while on the 80 per cent distribution Blythe Colour 4s. ordinary rose 5s. to 55s. Glaxo Laboratories shares were £21¼.

Shares of companies connected with plastics received more attention, Kleemann remaining active and touching 100s. 3d. at one time. De La Rue (now 5s. shares) moved up to 75s. British Xylonite were £7⅛, and British Industrial Plastics 2s. ordinary 8s. 9d. The units of the Distillers Co. were 138s., and United Molasses 56s. 3d. British Glues & Chemicals 4s. ordinary were 17s. xd, and Erinoid 5s. shares 14s. 6d. Beechams deferred were good at 28s. 6d., as were shares of a large number of other companies which seem likely to benefit considerably from the abolition of E.P.T. Sangers were 34s., and elsewhere, Turner & Newall rallied well at 87s. 6d. Oil shares moved higher on balance, Anglo-Iranian being £7¼; Burmah Oil 79s. 4½d.; Shell £5 3/16, while Lobitos moved up to 78s.; and there was a revival of activity in Mexican Eagle Oil (17s.) on rumours of fresh developments.

British Chemical Prices

Market Reports

MANCHESTER.—Both production and consumption of chemical products in the Lancashire area during recent weeks has been seriously affected by the fuel crisis, which has naturally left its mark also on new business in a good many lines. On the whole, however, there has been fairly steady pressure for deliveries of materials already on order, though it was to be expected under the circumstances that these would be on a reduced scale. A good many of the using establishments have resumed operations this week, though in the textile trades especially the shortage of coal is interfering with a restart and difficult conditions in this respect are expected to continue during the coming weeks. In the meantime, firm prices rule in all sections of the chemical market, which during the past few days has been fairly active, with fresh business on offer on both home and export accounts

GLASGOW.—In the Scottish heavy chemical trade business was very quiet during the past week, owing to road conditions and the cessation of production in many industries. Inquiries have been on the usual heavy scale for the following chemicals which have been in short supply for many months: alkalis, salt, and Epsom salts. Aggravating the poor supply position in most of the products in question is the serious shortage of hessian bags, and simultaneously a number of export orders have been executed in paper bags.

Welsh Tinplate Modernisation

£50 Million Scheme Proposed

IMPORTANT benefits to a very large section of the South Wales tinplate industry are expected to result from the formation of the Steel Company of Wales, with a capital of approximately £50 million to co-ordinate, modernise and develop some of the largest plants in South Wales. The companies participating are Richard Thomas & Baldwins, Guest Keen & Baldwins Iron & Steel Co., Ltd., Guest Keen & Nettlefolds, Ltd., Llanelly Associated Tinplate Companies and John Lysaght, Ltd. Other companies may later become associated with the scheme, which has the full support of the Iron and Steel Federation.

Mr. E. H. Lever, chairman of Richard Thomas & Baldwins, said that the Steel Company of Wales, provided it received the approval of the Steel Board, would undertake the planning, erecting and management of new hot strip and cold reduction plants and would control the marketing in home and world markets. It was not a financial merger but a co-operative effort on the parts of proprietors, managers, technicians and workers to raise the quality and reduce the price of sheets, tinplates and other products. From an engineering point of view, the modernisation of the mills concerned could be completed in 2½ to 3 years, but it would rest with the Government to decide the degree of priority to be accorded to the project.

A British delegation is expected in Brussels on Monday, March 10 to discuss supplies of steel from Belgium to Great Britain. It will comprise Mr. J. Penton, of the Treasury, and Capt. H. Read, of the Iron and Steel Corporation. It is understood that Britain wishes to import 100,000 tons of steel from Belgium.

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Patents in the Chemical Industry

The following information is prepared from the Official Patents Journal. Printed copies of specifications accepted may be obtained from the Patent Office, Southampton Buildings, London, W.C.2., at 1s. each. Numbers given under "Applications for Patents" are for reference in all correspondence up to acceptance of the complete specification.

Complete Specifications Open to Public Inspection

Soldering in an atmosphere of protective gas.—Brown, Boveri, & Cie., A.-G. July 4, 1945. 30516/45.

Heat treatment of magnesium base alloys. Aluminium Co. of America. December 16, 1944. 34676/46.

Monoalkamine esters of substituted pyrrole-3-carboxylic acids.—American Cyanamid Co. July 31, 1943. 12044/44.

Manufacture of organic compounds.—British Celanese, Ltd. July 3, 1945. 13748/46.

Cyclic polymers of dimethyl silanone.—British Thomson-Houston Co., Ltd. October 29, 1942. 17943/43.

Polymers of dimethylsilanone.—British Thomson-Houston Co., Ltd. October 29, 1942. 17944/43.

Synthetic waxes.—British Thomson-Houston Co., Ltd. July 4, 1945. 19940/46.

Wax-resin compositions.—British Thomson-Houston Co., Ltd. July 4, 1945. 20062/46.

Resinous compositions.—British Thomson-Houston Co., Ltd. July 4, 1945. 20063/46.

Drying varnishes or other substances forming coatings on objects.—J. L. G. Caget. January 17, 1941. 35131/46.

Production of textile filaments, fibres, and yarns.—Carbide & Carbon Chemicals Corporation. March 4, 1943. 8754/44.

Polymerisation of ethylene.—Carbide & Carbon Chemicals Corporation. July 22, 1943. 13668/44.

Separation and purification of stereoisomeric hydrophenanthrene carboxylic acids and ring homologues thereof.—Ciba, Ltd. July 6, 1945. 31020-21/45.

Manufacture of dibenzanthrone compounds. E. I. du Pont de Nemours & Co. February 23, 1944. 4576/45.

Stabilised synthetic resins.—E. I. du Pont de Nemours & Co. July 4, 1945. 19449/46.

Separating mixed solid fatty acids from animal fat.—Emery Industries, Inc. July 29, 1940. 35154/46.

Separating the components of a liquid system or solution.—Emery Industries, Inc. November 22, 1941. 35299/46.

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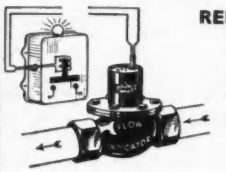

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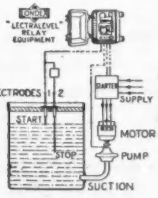

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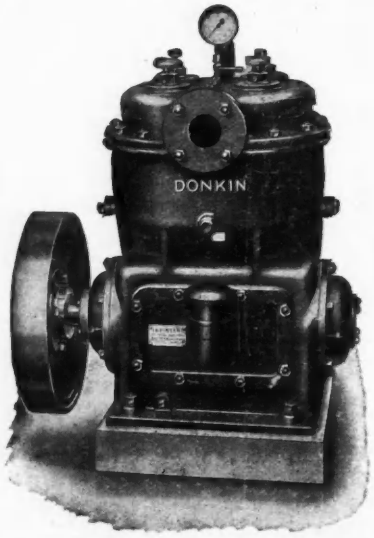

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